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THE

AMERICAN EPHEMERIS

AND

NAUTICAL ALMANAC

FOR THE YEAR

1889

FIRST EDITION

PUBLISHED IN COMPLIANCE WITH A JOINT RESOLUTION OF THE FORTY-SIXTH CONGRESS

WASHINGTON:
BUREAU OF NAVIGATION.
1886.

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JOINT RESOLUTION

FOR PRINTING THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That there shall be printed annually at the Government Printing Office fifteen hundred copies of the American Ephemeris and Nautical Almanac and of the papers supplementary thereto, of which one hundred shall be for the use of the Senate, four hundred for the House of Representatives, and one thousand for the public service, to be distributed by the Navy Department.

Sec. 2. *That additional copies of the Ephemeris and of the Nautical Almanac extracted therefrom may be ordered by the Secretary of the Navy for sale: Provided, That all moneys received from such sale shall be deposited in the Treasury to the credit of the appropriation for public printing.*

Approved, February 11, 1880.

PREFACE.

THE contents of the present volume of *The American Ephemeris* are, in general, similar to those of the volume for the preceding year. Beginning with the volume for the year 1882, the arrangement of the work is as follows:—

Part I, *Ephemeris for the Meridian of Greenwich,* gives the positions of the major planets, and other fundamental astronomical data for equidistant intervals of Greenwich mean time.

Part II, *Ephemeris for the Meridian of Washington,* gives the ephemerides of the fixed stars, sun, moon, and major planets for transit over the meridian of Washington. The mean places of the fixed stars and data for their reduction are also included in this Part. The list of mean and apparent places of fixed stars has been greatly enlarged, for the convenience of field-astronomers.

Part III, *Phenomena,* contains predictions of phenomena to be observed, with data for their computation. Washington mean time is used in this part except in a few cases, notably that of eclipses, where Greenwich mean time was judged more convenient. The additions comprise more complete data for eclipses of the sun, diagrams showing the configurations of the satellites of Jupiter, data respecting the disks of Mercury and Venus for the reduction of meridian and photometric observations, and diagrams, with tables, for identifying any known satellites of other planets.

SIMON NEWCOMB,

Professor U. S. Navy, Superintendent.

WASHINGTON, *April,* 1886.

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CORRECTIONS.

The American Nautical Almanac for 1886 (*First Edition only*).

Page 253,	Eclipse Charts, first line,	*for* August 8—9	*read* August 28—9.
261,	Twenty-third line,	" $21^h 5^m 57^s.4$	" $21^h 6^m 55^s.06$

The American Ephemeris and Nautical Almanac for 1886 (*First Edition*).

Page 113,	July 5, Moon's Upper Transit,	*for* $2^h 32^m.8$	*read* $3^h 32^m.8$
200,	Dec. 22, Equation of Time,	" $0^m 8^s.54$	" $1^m 8^s.54$

263, To the heliocentric longitude of Neptune apply the following corrections:
Jan. 3, —0″.80; Mar. 8, —0″.96; May 3, —1″.12; July 6, —1″.30; Sept. 8, —1″.48; Nov. 3, —1″.62; Dec. 37, —1″.80, and interpolated values for intermediate dates.

249, 409 and 410, To the apparent R. A. and Dec. of Neptune apply the following corrections:

	R. A.	Dec.
	s	″
Jan. 3,	— 0.05	— 0.2
April 9,	— 0.05	— 0.2
Aug. 15,	— 0.10	— 0.3
Dec. 21,	— 0.11	— 0.5

and interpolated values for intermediate dates.

276, From Nov. 16 to Dec. 36, increase ☊′ by 1′.

482, Under "Washington Mean Times of Elongations," *for* Titania *read* Ariel and *for* Ariel *read* Titania.

504,	Lines 5, 8 and 9 from top,	*for* sin φ'	*read* cos φ'
516,	Line 8,	" 1885.0	" 1886.0
517,	Line 30,	" adapted	" adopted.

Ephemeris for 1887 (*First Edition only*).

Page 294,	*f* Tauri, in last column,	*for* 12.753	*read* 12.573
296,	Dec. of α Hydræ,	" +	" —
297,	In all copies of Ephemeris from 1882 to 1887, *for* 31 Coronæ Borealis *read* 31 Comæ Berenices.		
298,	ι Cassiopeæ, last column,	*for* +	" —
298,	Dec. of β Coronæ Borealis,	" 46″.92	" 43″.92
299,	Groomb. 944, Ann. Var. in R. A.,	" —	" +
300,	1 Draconis (H.) in R. A.	" $57^s.747$	" $54^s.747$
511,	16th line from bottom,	" γ	" Y
512,	Annapolis mean time of Emersion,	" 5^h	" 6^h

The American Nautical Almanac for 1888 (*First Edition*).

Page 248,	Ann. Var. in Dec. of δ Orionis,	*for* —2″.93	*read* +2″.93

Ephemeris for 1888 (*First Edition*).

Page 293,	R. A of 6 Ursæ Minoris,	*for* $20^s.008$	*read* $20^s.080$
294,	47 Cephei (H.) Ann. Var. in R. A.,	" $+7^s.5152$	" $+7^s.7152$
297,	β Chamæleontis, " "	" $+3^s.3706$	" $+3^s.3996$
297,	α Canum Venat., " "		" $+2^s.8157$
298,	4 Ursæ Minoris, " "	" $-0^s.3349$	" $-0^s.3249$
298,	ρ Bootis, Ann. Var. in Dec.,	" —15″.695	" —15″.965
299,	δ Ursæ Minoris, Dec.,	" 20″.24	" 40″.24
300,	θ Lyræ, R. A.,	" $30^s.791$	" $28^s.791$
302 to 312,	To the R. A. of α Ursæ Minoris apply the correction $-0^s.04$.		
322,	Dec. of 11 Orionis,	*for* South.	" North.

CHRONOLOGICAL ERAS AND CYCLES.

CHRONOLOGICAL ERAS.

THE YEAR 1889, WHICH COMPRISES THE LATTER PART OF THE 113TH AND THE BEGINNING OF THE 114TH YEAR OF THE INDEPENDENCE OF THE UNITED STATES OF AMERICA, CORRESPONDS TO—

The year 6602 of the Julian Period;

“ 7397–98 of the Byzantine era, the year 7398 commencing on September 1st;

“ 5649–50 of the Jewish era, the year 5650 commencing on September 26th, or, more exactly, at sunset on September 25th;

“ 2642 since the foundation of Rome, according to Varro;

“ 2636 since the beginning of the era of Nabonassar, which has been assigned to Wednesday, the 26th of February of the 3967th year of the Julian Period: corresponding, in the notation of chronologists, to the 747th; and, in the notation of astronomers, to the 746th year before the birth of Christ;

“ 2665 of the Olympiads, or the first year of the 667th Olympiad commencing in July, 1889, if we fix the era of the Olympiads at 775½ years before Christ, or near the beginning of July of the year 3938 of the Julian Period;

“ 2201 of the Grecian era, or the era of the Seleucidæ;

“ 1605 of the era of Diocletian;

“ 2549 of the Japanese era and to the 22d year of the period entitled “Meiji.”

The year 1307 of the Mohammedan era, or the era of the Hegira, begins on the 28th day of August, 1889.

The first day of January of the year 1889 is the 2,411,004th day since the commencement of the Julian Period.

CHRONOLOGICAL CYCLES.

Dominical Letter	F	Solar Cycle	22
Epact	28	Roman Indiction	2
Lunar Cycle or Golden Number	9	Julian Period	6602

SYMBOLS AND ABBREVIATIONS.

SIGNS OF THE PLANETS, ETC.

☉ The Sun.
☾ The Moon.
☿ Mercury.
♀ Venus.
⊕ The Earth.
♂ Mars.
♃ Jupiter.
♄ Saturn.
⛢ Uranus.
♆ Neptune.

SIGNS OF THE ZODIAC.

Spring Signs.
- 1. ♈ Aries.
- 2. ♉ Taurus.
- 3. ♊ Gemini.

Summer Signs.
- 4. ♋ Cancer.
- 5. ♌ Leo.
- 6. ♍ Virgo.

Autumn Signs.
- 7. ♎ Libra.
- 8. ♏ Scorpius.
- 9. ♐ Sagittarius

Winter Signs.
- 10. ♑ Capricornus.
- 11. ♒ Aquarius.
- 12. ♓ Pisces.

ASPECTS.

☌ Conjunction, or having the same Longitude or Right Ascension.
□ Quadrature, or differing 90° in Longitude or Right Ascension.
☍ Opposition, or differing 180° in Longitude or Right Ascension.

ABBREVIATIONS.

☊ Ascending Node.
☋ Descending Node.
N. North.
S. South.
E. East.
W. West.
° Degrees.
′ Minutes of Arc.
″ Seconds of Arc.
^{h} Hours.
^{m} Minutes of Time.
^{s} Seconds of Time.

PART I.

ASTRONOMICAL EPHEMERIS

FOR THE

MERIDIAN OF GREENWICH.

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Tues.	1	18 49 19.71	11.040	S. 22 58 5.2	+13.00	16 18.40	71.06	4 0.52	1.180
Wed.	2	18 53 44.50	11.025	22 52 39.3	14.15	16 18.40	71.01	4 28.67	1.166
Thur.	3	18 58 8.91	11.008	22 46 46.2	15.28	16 18.39	70.96	4 56.45	1.149
Frid.	4	19 2 32.92	10.991	22 40 25.9	+16.41	16 18.38	70.91	5 23.83	1.132
Sat.	5	19 6 56.50	10.971	22 33 38.6	17.53	16 18.36	70.85	5 50.77	1.113
SUN.	6	19 11 19.60	10.951	22 26 24.6	18.64	16 18.34	70.79	6 17.24	1.092
Mon.	7	19 15 42.19	10.929	22 18 44.0	+19.74	16 18.32	70.72	6 43.20	1.070
Tues.	8	19 20 4.24	10.907	22 10 37.1	20.83	16 18.29	70.65	7 8.63	1.048
Wed.	9	19 24 25.73	10.883	22 2 4.1	21.91	16 18.25	70.58	7 33.49	1.024
Thur.	10	19 28 46.63	10.859	21 53 5.3	+22.98	16 18.21	70.50	7 57.77	1.000
Frid.	11	19 33 6.93	10.833	21 43 40.9	24.04	16 18.17	70.42	8 21.45	0.974
Sat.	12	19 37 26.60	10.807	21 33 51.3	25.09	16 18.12	70.33	8 44.51	0.948
SUN.	13	19 41 45.63	10.780	21 23 36.7	+26.12	16 18.06	70.25	9 6.92	0.921
Mon.	14	19 46 3.99	10.752	21 12 57.4	27.14	16 17.99	70.16	9 28.67	0.893
Tues.	15	19 50 21.67	10.723	21 1 53.7	28.15	16 17.93	70.07	9 49.73	0.864
Wed.	16	19 54 38.65	10.693	20 50 25.9	+29.15	16 17.86	69.97	10 10.10	0.835
Thur.	17	19 58 54.92	10.663	20 38 34.3	30.13	16 17.78	69.87	10 29.76	0.805
Frid.	18	20 3 10.47	10.633	20 26 19.4	31.10	16 17.69	69.77	10 48.70	0.775
Sat.	19	20 7 25.29	10.603	20 13 41.3	+32.06	16 17.60	69.67	11 6.92	0.745
SUN.	20	20 11 39.38	10.572	20 0 40.4	33.00	16 17.50	69.56	11 24.41	0.714
Mon.	21	20 15 52.72	10.541	19 47 17.1	33.93	16 17.39	69.45	11 41.16	0.683
Tues.	22	20 20 5.31	10.509	19 33 31.7	+34.84	16 17.28	69.34	11 57.14	0.651
Wed.	23	20 24 17.13	10.477	19 19 24.6	35.74	16 17.17	69.23	12 12.36	0.619
Thur.	24	20 28 28.18	10.445	19 4 56.1	36.62	16 17.05	69.12	12 26.81	0.587
Frid.	25	20 32 38.45	10.412	18 50 6.6	+37.49	16 16.93	69.01	12 40.48	0.555
Sat.	26	20 36 47.93	10.379	18 34 56.4	38.34	16 16.80	68.90	12 53.37	0.522
SUN.	27	20 40 56.61	10.346	18 19 26.0	39.17	16 16.67	68.79	13 5.47	0.489
Mon.	28	20 45 4.50	10.312	18 3 35.8	+39.99	16 16.53	68.67	13 16.76	0.455
Tues.	29	20 49 11.58	10.278	17 47 26.2	40.79	16 16.39	68.56	13 27.25	0.421
Wed.	30	20 53 17.84	10.244	17 30 57.5	41.58	16 16.25	68.44	13 36.93	0.387
Thur.	31	20 57 23.28	10.210	17 14 10.1	42.35	16 16.10	68.33	13 45.80	0.353
Frid.	32	21 1 27.89	10.175	S. 16 57 4.4	+43.10	16 15.95	68.21	13 53.83	0.318

NOTE.—The mean time of semidiameter passing may be found by subtracting 0s.19 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	THE SUN'S Diff. for 1 Hour.	THE SUN'S Apparent Declination.	THE SUN'S Diff. for 1 Hour.	Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ′ ″	s	m s	s	h m s
Tues.	1	18 49 18.97	11.036	S. 22 58 6.0	+12.99	4 0.45	1.180	18 45 18.52
Wed.	2	18 53 43.67	11.021	22 52 40.4	14.14	4 28.59	1.166	18 49 15.08
Thur.	3	18 58 8.00	11.005	22 46 47.5	15.27	4 56.36	1.149	18 53 11.64
Frid.	4	19 2 31.93	10.988	22 40 27.4	+16.40	5 23.73	1.132	18 57 8.20
Sat.	5	19 6 55.43	10.968	22 33 40.3	17.52	5 50.67	1.113	19 1 4.76
SUN.	6	19 11 18.45	10.948	22 26 26.5	18.63	6 17.14	1.092	19 5 1.31
Mon.	7	19 15 40.96	10.926	22 18 46.2	+19.73	6 43.09	1.070	19 8 57.87
Tues.	8	19 20 2.94	10.904	22 10 39.6	20.82	7 8.51	1.048	19 12 54.43
Wed.	9	19 24 24.36	10.880	22 2 6.9	21.90	7 33.37	1.024	19 16 50.99
Thur.	10	19 28 45.19	10.856	21 53 8.4	+22.97	7 57.65	1.000	19 20 47.54
Frid.	11	19 33 5.42	10.830	21 43 44.3	24.03	8 21.32	0.974	19 24 44.10
Sat.	12	19 37 25.03	10.804	21 33 55.0	25.08	8 44.37	0.948	19 28 40.66
SUN.	13	19 41 44.00	10.777	21 23 40.7	+26.11	9 6.78	0.921	19 32 37.22
Mon.	14	19 46 2.30	10.749	21 13 1.7	27.13	9 28.53	0.893	19 36 33.77
Tues.	15	19 50 19.92	10.720	21 1 58.3	28.14	9 49.59	0.864	19 40 30.33
Wed.	16	19 54 36.84	10.691	20 50 30.8	+29.14	10 9.96	0.835	19 44 26.88
Thur.	17	19 58 53.06	10.661	20 38 39.6	30.12	10 29.62	0.805	19 48 23.44
Frid.	18	20 3 8.56	10.631	20 26 25.0	31.09	10 48.56	0.775	19 52 20.00
Sat.	19	20 7 23.34	10.601	20 13 47.2	+32.05	11 6.78	0.745	19 56 16.56
SUN.	20	20 11 37.38	10.570	20 0 46.7	32.99	11 24.27	0.714	20 0 13.11
Mon.	21	20 15 50.68	10.539	19 47 23.7	33.92	11 41.02	0.683	20 4 9.66
Tues.	22	20 20 3.23	10.507	19 33 38.6	+34.83	11 57.01	0.651	20 8 6.22
Wed.	23	20 24 15.01	10.475	19 19 31.8	35.73	12 12.23	0.619	20 12 2.78
Thur.	24	20 28 26.02	10.443	19 5 3.7	36.61	12 26.68	0.587	20 15 59.34
Frid.	25	20 32 36.26	10.411	18 50 14.5	+37.48	12 40.36	0.555	20 19 55.90
Sat.	26	20 36 45.71	10.378	18 35 4.6	38.33	12 53.26	0.522	20 23 52.45
SUN.	27	20 40 54.36	10.345	18 19 34.6	39.16	13 5.36	0.489	20 27 49.00
Mon.	28	20 45 2.22	10.311	18 3 44.7	+39.98	13 16.66	0.455	20 31 45.56
Tues.	29	20 49 9.28	10.277	17 47 35.4	40.78	13 27.16	0.421	20 35 42.12
Wed.	30	20 53 15.52	10.243	17 31 7.0	41.57	13 36.85	0.387	20 39 38.67
Thur.	31	20 57 20.94	10.209	17 14 19.9	42.34	13 45.72	0.353	20 43 35.22
Frid.	32	21 1 25.54	10.174	S. 16 57 14.5	+43.09	13 53.76	0.318	20 47 31.78

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

Diff. for 1 Hour,
+ 9s.8565.
(Table III.)

THE

AMERICAN EPHEMERIS

AND

NAUTICAL ALMANAC

FOR THE YEAR

1889

FIRST EDITION

PUBLISHED IN COMPLIANCE WITH A JOINT RESOLUTION OF THE FORTY-SIXTH CONGRESS

WASHINGTON:
BUREAU OF NAVIGATION.
1886.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	TUESDAY 1.					**THURSDAY 3.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	18 26 2.24	2.6977	S. 21 55 46.9	1.647	0	20 32 56.35	2.5402	S. 20 10 16.1	5.752
1	18 28 44.10	2.6977	21 57 20.8	1.482	1	20 35 28.58	2.5342	20 4 27.1	5.882
2	18 31 25.96	2.6976	21 58 44.7	1.316	2	20 38 0.45	2.5281	19 58 30.3	6.010
3	18 34 7.81	2.6973	21 59 58.7	1.151	3	20 40 31.95	2.5219	19 52 25.9	6.137
4	18 36 49.64	2.6968	22 1 2.8	0.985	4	20 43 3.08	2.5157	19 46 13.9	6.262
5	18 39 31.44	2.6962	22 1 56.9	0.819	5	20 45 33.84	2.5095	19 39 54.5	6.385
6	18 42 13.19	2.6954	22 2 41.1	0.654	6	20 48 4.22	2.5032	19 33 27.7	6.507
7	18 44 54.89	2.6946	22 3 15.4	0.488	7	20 50 34.22	2.4968	19 26 53.6	6.628
8	18 47 36.54	2.6936	22 3 39.7	0.322	8	20 53 3.83	2.4903	19 20 12.3	6.748
9	18 50 18.12	2.6923	22 3 54.1	– 0.157	9	20 55 33.06	2.4839	19 13 23.8	6.867
10	18 52 59.62	2.6910	22 3 58.6	+ 0.008	10	20 58 1.90	2.4774	19 6 28.3	6.983
11	18 55 41.04	2.6895	22 3 53.2	0.173	11	21 0 30.35	2.4708	18 59 25.9	7.097
12	18 58 22.36	2.6878	22 3 37.9	0.337	12	21 2 58.40	2.4642	18 52 16.7	7.210
13	19 1 3.58	2.6860	22 3 12.8	0.501	13	21 5 26.05	2.4576	18 45 0.7	7.322
14	19 3 44.68	2.6840	22 2 37.8	0.665	14	21 7 53.31	2.4510	18 37 38.0	7.432
15	19 6 25.66	2.6819	22 1 53.0	0.828	15	21 10 20.17	2.4443	18 30 8.8	7.541
16	19 9 6.51	2.6797	22 0 58.4	0.991	16	21 12 46.62	2.4375	18 22 33.1	7.648
17	19 11 47.22	2.6773	21 59 54.1	1.154	17	21 15 12.67	2.4307	18 14 51.0	7.753
18	19 14 27.78	2.6747	21 58 40.0	1.316	18	21 17 38.31	2.4239	18 7 2.7	7.857
19	19 17 8.18	2.6720	21 57 16.2	1.477	19	21 20 3.54	2.4172	17 59 8.2	7.960
20	19 19 48.42	2.6692	21 55 42.8	1.637	20	21 22 28.37	2.4104	17 51 7.5	8.062
21	19 22 28.48	2.6662	21 53 59.8	1.797	21	21 24 52.79	2.4036	17 43 0.8	8.162
22	19 25 8.36	2.6631	21 52 7.2	1.957	22	21 27 16.80	2.3967	17 34 48.1	8.260
23	19 27 48.05	2.6598	S. 21 50 5.0	2.116	23	21 29 40.40	2.3898	S. 17 26 29.6	8.356
	WEDNESDAY 2.					**FRIDAY 4.**			
0	19 30 27.54	2.6564	S. 21 47 53.3	2.273	0	21 32 3.58	2.3829	S. 17 18 5.4	8.450
1	19 33 6.82	2.6528	21 45 32.2	2.430	1	21 34 26.35	2.3761	17 9 35.6	8.543
2	19 35 45.88	2.6492	21 43 1.7	2.586	2	21 36 48.71	2.3692	17 1 0.2	8.636
3	19 38 24.72	2.6454	21 40 21.9	2.741	3	21 39 10.66	2.3624	16 52 19.3	8.727
4	19 41 3.33	2.6415	21 37 32.8	2.896	4	21 41 32.20	2.3555	16 43 33.0	8.815
5	19 43 41.70	2.6375	21 34 34.4	3.049	5	21 43 53.32	2.3486	16 34 41.5	8.901
6	19 46 19.83	2.6333	21 31 26.9	3.201	6	21 46 14.03	2.3417	16 25 44.9	8.986
7	19 48 57.70	2.6290	21 28 10.3	3.352	7	21 48 34.33	2.3349	16 16 43.2	9.071
8	19 51 35.31	2.6246	21 24 44.6	3.503	8	21 50 54.22	2.3281	16 7 36.4	9.154
9	19 54 12.65	2.6201	21 21 9.9	3.653	9	21 53 13.70	2.3213	15 58 24.7	9.235
10	19 56 49.72	2.6155	21 17 26.2	3.801	10	21 55 32.77	2.3145	15 49 8.2	9.314
11	19 59 26.51	2.6107	21 13 33.7	3.948	11	21 57 51.44	2.3077	15 39 47.0	9.392
12	20 2 3.01	2.6058	21 9 32.4	4.094	12	22 0 9.70	2.3009	15 30 21.1	9.469
13	20 4 39.21	2.6008	21 5 22.4	4.239	13	22 2 27.55	2.2942	15 20 50.7	9.544
14	20 7 15.11	2.5958	21 1 3.7	4.384	14	22 4 45.00	2.2874	15 11 15.8	9.618
15	20 9 50.71	2.5907	20 56 36.3	4.527	15	22 7 2.04	2.2807	15 1 36.5	9.690
16	20 12 25.99	2.5854	20 52 0.4	4.668	16	22 9 18.68	2.2740	14 51 53.0	9.760
17	20 15 0.96	2.5801	20 47 16.1	4.807	17	22 11 34.92	2.2673	14 42 5.3	9.830
18	20 17 35.60	2.5746	20 42 23.5	4.946	18	22 13 50.76	2.2607	14 32 13.4	9.898
19	20 20 9.91	2.5691	20 37 22.6	5.084	19	22 16 6.21	2.2542	14 22 17.5	9.964
20	20 22 43.89	2.5635	20 32 13.4	5.221	20	22 18 21.26	2.2476	14 12 17.7	10.029
21	20 25 17.53	2.5577	20 26 56.1	5.356	21	22 20 35.92	2.2411	14 2 14.0	10.092
22	20 27 50.82	2.5519	20 21 30.7	5.490	22	22 22 50.19	2.2346	13 52 6.6	10.154
23	20 30 23.76	2.5461	20 15 57.3	5.622	23	22 25 4.07	2.2281	13 41 55.5	10.215
24	20 32 56.35	2.5402	S. 20 10 16.1	5.752	24	22 27 17.56	2.2217	S. 13 31 40.8	10.274

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SATURDAY 5.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	22 27 17.56	2.2217	S. 13 31 40.8	10.274
1	22 29 30.67	2.2153	13 21 22.6	10.332
2	22 31 43.40	2.2090	13 11 0.9	10.389
3	22 33 55.75	2.2027	13 0 35.9	10.444
4	22 36 7.72	2.1964	12 50 7.6	10.498
5	22 38 19.32	2.1902	12 39 36.1	10.551
6	22 40 30.55	2.1841	12 29 1.5	10.602
7	22 42 41.41	2.1780	12 18 23.9	10.652
8	22 44 51.91	2.1719	12 7 43.3	10.701
9	22 47 2.04	2.1658	11 56 59.8	10.748
10	22 49 11.81	2.1599	11 46 13.5	10.794
11	22 51 21.23	2.1540	11 35 24.5	10.839
12	22 53 30.29	2.1481	11 24 32.8	10.882
13	22 55 39.01	2.1424	11 13 38.6	10.924
14	22 57 47.38	2.1366	11 2 41.9	10.966
15	22 59 55.40	2.1308	10 51 42.7	11.006
16	23 2 3.08	2.1252	10 40 41.2	11.044
17	23 4 10.43	2.1197	10 29 37.4	11.082
18	23 6 17.45	2.1142	10 18 31.4	11.118
19	23 8 24.14	2.1087	10 7 23.3	11.153
20	23 10 30.50	2.1032	9 56 13.1	11.187
21	23 12 36.53	2.0978	9 45 0.9	11.219
22	23 14 42.24	2.0926	9 33 46.8	11.251
23	23 16 47.64	2.0874	S. 9 22 30.8	11.282

SUNDAY 6.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	23 18 52.73	2.0823	S. 9 11 13.0	11.311
1	23 20 57.51	2.0772	8 59 53.5	11.339
2	23 23 1.99	2.0721	8 48 32.3	11.367
3	23 25 6.16	2.0671	8 37 9.5	11.393
4	23 27 10.04	2.0622	8 25 45.2	11.418
5	23 29 13.63	2.0573	8 14 19.4	11.442
6	23 31 16.92	2.0525	8 2 52.2	11.464
7	23 33 19.93	2.0478	7 51 23.7	11.486
8	23 35 22.66	2.0431	7 39 53.9	11.507
9	23 37 25.11	2.0385	7 28 22.8	11.528
10	23 39 27.28	2.0340	7 16 50.5	11.546
11	23 41 29.19	2.0296	7 5 17.2	11.563
12	23 43 30.83	2.0252	6 53 42.9	11.580
13	23 45 32.21	2.0208	6 42 7.6	11.597
14	23 47 33.33	2.0166	6 30 31.3	11.613
15	23 49 34.20	2.0124	6 18 54.1	11.627
16	23 51 34.81	2.0082	6 7 16.1	11.639
17	23 53 35.18	2.0042	5 55 37.4	11.650
18	23 55 35.31	2.0002	5 43 58.1	11.661
19	23 57 35.20	1.9962	5 32 18.1	11.672
20	23 59 34.86	1.9924	5 20 37.4	11.682
21	0 1 34.29	1.9886	5 8 56.2	11.691
22	0 3 33.49	1.9848	4 57 14.5	11.698
23	0 5 32.46	1.9810	4 45 32.4	11.705
24	0 7 31.21	1.9774	S. 4 33 49.9	11.711

MONDAY 7.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	0 7 31.21	1.9774	S. 4 33 49.9	11.711
1	0 9 29.75	1.9740	4 22 7.1	11.716
2	0 11 28.09	1.9706	4 10 24.0	11.720
3	0 13 26.22	1.9672	3 58 40.7	11.724
4	0 15 24.15	1.9638	3 46 57.2	11.727
5	0 17 21.88	1.9606	3 35 13.5	11.729
6	0 19 19.42	1.9574	3 23 29.7	11.730
7	0 21 16.77	1.9543	3 11 45.9	11.730
8	0 23 13.93	1.9512	3 0 2.1	11.729
9	0 25 10.91	1.9482	2 48 18.4	11.728
10	0 27 7.71	1.9452	2 36 34.8	11.726
11	0 29 4.34	1.9424	2 24 51.3	11.723
12	0 31 0.80	1.9396	2 13 8.0	11.720
13	0 32 57.09	1.9368	2 1 24.9	11.715
14	0 34 53.22	1.9342	1 49 42.2	11.709
15	0 36 49.20	1.9317	1 37 59.8	11.703
16	0 38 45.03	1.9292	1 26 17.8	11.697
17	0 40 40.71	1.9267	1 14 36.2	11.690
18	0 42 36.24	1.9243	1 2 55.0	11.682
19	0 44 31.63	1.9220	0 51 14.3	11.673
20	0 46 26.88	1.9197	0 39 34.2	11.663
21	0 48 22.00	1.9176	0 27 54.7	11.653
22	0 50 16.99	1.9155	0 16 15.8	11.643
23	0 52 11.86	1.9134	S. 0 4 37.6	11.632

TUESDAY 8.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	0 54 6.60	1.9114	N. 0 7 0.0	11.620
1	0 56 1.23	1.9095	0 18 36.8	11.607
2	0 57 55.75	1.9077	0 30 12.8	11.593
3	0 59 50.15	1.9058	0 41 47.9	11.578
4	1 1 44.44	1.9041	0 53 22.2	11.563
5	1 3 38.64	1.9025	1 4 55.5	11.548
6	1 5 32.74	1.9008	1 16 27.9	11.532
7	1 7 26.74	1.8993	1 27 59.3	11.515
8	1 9 20.66	1.8979	1 39 29.7	11.498
9	1 11 14.49	1.8965	1 50 59.1	11.480
10	1 13 8.24	1.8952	2 2 27.3	11.461
11	1 15 1.91	1.8939	2 13 54.4	11.442
12	1 16 55.50	1.8926	2 25 20.3	11.422
13	1 18 49.02	1.8914	2 36 45.0	11.401
14	1 20 42.47	1.8903	2 48 8.4	11.380
15	1 22 35.86	1.8893	2 59 30.6	11.359
16	1 24 29.19	1.8884	3 10 51.5	11.336
17	1 26 22.47	1.8876	3 22 11.0	11.312
18	1 28 15.70	1.8867	3 33 29.0	11.288
19	1 30 8.88	1.8859	3 44 45.6	11.265
20	1 32 2.01	1.8852	3 56 0.8	11.241
21	1 33 55.10	1.8845	4 7 14.5	11.215
22	1 35 48.15	1.8839	4 18 26.6	11.189
23	1 37 41.17	1.8834	4 29 37.1	11.163
24	1 39 34.16	1.8829	N. 4 40 46.1	11.136

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

WEDNESDAY 9.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	1 39 34.16	1.8829	N. 4 40 46.1	11.136
1	1 41 27.12	1.8825	4 51 53.4	11.108
2	1 43 20.06	1.8821	5 2 59.0	11.080
3	1 45 12.98	1.8818	5 14 3.0	11.052
4	1 47 5.88	1.8816	5 25 5.2	11.022
5	1 48 58.77	1.8814	5 36 5.6	10.991
6	1 50 51.65	1.8813	5 47 4.1	10.960
7	1 52 44.53	1.8812	5 58 0.8	10.929
8	1 54 37.40	1.8812	6 8 55.6	10.897
9	1 56 30.27	1.8813	6 19 48.5	10.865
10	1 58 23.15	1.8814	6 30 39.4	10.833
11	2 0 16.04	1.8815	6 41 28.4	10.800
12	2 2 8.93	1.8817	6 52 15.4	10.766
13	2 4 1.84	1.8820	7 3 0.3	10.731
14	2 5 54.77	1.8824	7 13 43.1	10.696
15	2 7 47.73	1.8828	7 24 23.8	10.660
16	2 9 40.71	1.8832	7 35 2.3	10.623
17	2 11 33.71	1.8836	7 45 38.6	10.587
18	2 13 26.74	1.8842	7 56 12.7	10.550
19	2 15 19.81	1.8848	8 6 44.6	10.512
20	2 17 12.92	1.8855	8 17 14.2	10.473
21	2 19 6.07	1.8861	8 27 41.4	10.434
22	2 20 59.26	1.8868	8 38 6.3	10.395
23	2 22 52.49	1.8876	N. 8 48 28.8	10.354

THURSDAY 10.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	2 24 45.77	1.8885	N. 8 58 48.8	10.313
1	2 26 39.11	1.8895	9 9 6.4	10.272
2	2 28 32.51	1.8904	9 19 21.5	10.231
3	2 30 25.96	1.8914	9 29 34.1	10.188
4	2 32 19.47	1.8924	9 39 44.1	10.145
5	2 34 13.05	1.8936	9 49 51.5	10.102
6	2 36 6.70	1.8947	9 59 56.3	10.058
7	2 38 0.42	1.8959	10 9 58.4	10.013
8	2 39 54.21	1.8972	10 19 57.9	9.968
9	2 41 48.08	1.8984	10 29 54.6	9.922
10	2 43 42.02	1.8997	10 39 48.5	9.876
11	2 45 36.05	1.9011	10 49 39.7	9.830
12	2 47 30.16	1.9026	10 59 28.1	9.782
13	2 49 24.36	1.9041	11 9 13.6	9.734
14	2 51 18.65	1.9056	11 18 56.2	9.686
15	2 53 13.03	1.9072	11 28 35.9	9.637
16	2 55 7.51	1.9088	11 38 12.6	9.587
17	2 57 2.09	1.9104	11 47 46.3	9.536
18	2 58 56.76	1.9121	11 57 16.9	9.485
19	3 0 51.54	1.9138	12 6 44.5	9.434
20	3 2 46.42	1.9156	12 16 9.0	9.382
21	3 4 41.41	1.9174	12 25 30.4	9.330
22	3 6 36.51	1.9193	12 34 48.6	9.277
23	3 8 81.72	1.9212	12 44 3.6	9.223
24	3 10 27.05	1.9232	N.12 53 15.4	9.169

FRIDAY 11.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	3 10 27.05	1.9232	N.12 53 15.4	9.169
1	3 12 22.50	1.9252	13 2 23.9	9.114
2	3 14 18.07	1.9272	13 11 29.1	9.059
3	3 16 13.76	1.9292	13 20 31.0	9.003
4	3 18 9.57	1.9312	13 29 29.5	8.947
5	3 20 5.50	1.9333	13 38 24.6	8.889
6	3 22 1.56	1.9354	13 47 16.2	8.831
7	3 23 57.75	1.9376	13 56 4.3	8.773
8	3 25 54.07	1.9398	14 4 48.9	8.714
9	3 27 50.53	1.9421	14 13 30.0	8.655
10	3 29 47.13	1.9445	14 22 7.5	8.595
11	3 31 43.87	1.9468	14 30 41.4	8.535
12	3 33 40.75	1.9492	14 39 11.7	8.474
13	3 35 37.77	1.9515	14 47 38.3	8.412
14	3 37 34.93	1.9539	14 56 1.1	8.349
15	3 39 32.24	1.9564	15 4 20.2	8.286
16	3 41 29.70	1.9588	15 12 35.5	8.222
17	3 43 27.30	1.9613	15 20 46.9	8.158
18	3 45 25.05	1.9638	15 28 54.5	8.094
19	3 47 22.96	1.9664	15 36 58.2	8.028
20	3 49 21.02	1.9689	15 44 57.9	7.962
21	3 51 19.23	1.9715	15 52 53.6	7.896
22	3 53 17.60	1.9742	16 0 45.4	7.829
23	3 55 16.13	1.9768	N.16 8 33.1	7.761

SATURDAY 12.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	3 57 14.82	1.9795	N.16 16 16.7	7.692
1	3 59 13.67	1.9822	16 23 56.2	7.623
2	4 1 12.68	1.9849	16 31 31.5	7.554
3	4 3 11.85	1.9876	16 39 2.7	7.485
4	4 5 11.19	1.9903	16 46 29.7	7.414
5	4 7 10.69	1.9931	16 53 52.4	7.342
6	4 9 10.36	1.9959	17 1 10.7	7.269
7	4 11 10.20	1.9987	17 8 24.7	7.197
8	4 13 10.20	2.0014	17 15 34.3	7.124
9	4 15 10.37	2.0042	17 22 39.6	7.051
10	4 17 10.71	2.0071	17 29 40.4	6.976
11	4 19 11.22	2.0099	17 36 36.7	6.901
12	4 21 11.90	2.0128	17 43 28.5	6.825
13	4 23 12.75	2.0157	17 50 15.7	6.749
14	4 25 13.78	2.0186	17 56 58.3	6.673
15	4 27 14.98	2.0214	18 3 36.4	6.596
16	4 29 16.35	2.0243	18 10 9.8	6.517
17	4 31 17.90	2.0272	18 16 38.5	6.438
18	4 33 19.62	2.0302	18 23 2.4	6.359
19	4 35 21.52	2.0331	18 29 21.6	6.280
20	4 37 23.59	2.0360	18 35 36.0	6.199
21	4 39 25.84	2.0389	18 41 45.5	6.118
22	4 41 28.26	2.0418	18 47 50.2	6.037
23	4 43 30.86	2.0447	18 53 50.0	5.955
24	4 45 33.63	2.0477	N.18 59 44.8	5.872

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	SUNDAY 13.					**TUESDAY 15.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	4 45 33.63	2.0477	N.18 59 44.8	5.872	0	6 26 59.24	2.1692	N.21 55 55.6	1.281
1	4 47 36.58	2.0506	19 5 34.6	5.788	1	6 29 9.45	2.1710	21 57 9.3	1.175
2	4 49 39.70	2.0535	19 11 19.4	5.705	2	6 31 19.76	2.1727	21 58 16.6	1.068
3	4 51 43.00	2.0565	19 16 59.2	5.621	3	6 33 30.17	2.1743	21 59 17.5	0.962
4	4 53 46.48	2.0594	19 22 33.9	5.536	4	6 35 40.68	2.1759	22 0 12.0	0.855
5	4 55 50.13	2.0623	19 28 3.5	5.450	5	6 37 51.28	2.1775	22 1 0.1	0.747
6	4 57 53.95	2.0652	19 33 27.9	5.363	6	6 40 1.98	2.1791	22 1 41.7	0.639
7	4 59 57.95	2.0681	19 38 47.1	5.277	7	6 42 12.77	2.1806	22 2 16.8	0.532
8	5 2 2.12	2.0710	19 44 1.1	5.190	8	6 44 23.65	2.1820	22 2 45.5	0.424
9	5 4 6.47	2.0739	19 49 9.9	5.102	9	6 46 34.61	2.1834	22 3 7.7	0.316
10	5 6 10.99	2.0767	19 54 13.4	5.013	10	6 48 45.66	2.1847	22 3 23.4	0.207
11	5 8 15.68	2.0796	19 59 11.5	4.924	11	6 50 56.78	2.1860	22 3 32.6	+ 0.098
12	5 10 20.54	2.0824	20 4 4.3	4.835	12	6 53 7.98	2.1873	22 3 35.2	− 0.011
13	5 12 25.57	2.0853	20 8 51.7	4.745	13	6 55 19.26	2.1886	22 3 31.3	0.120
14	5 14 30.77	2.0882	20 13 33.7	4.654	14	6 57 30.61	2.1897	22 3 20.8	0.229
15	5 16 36.15	2.0910	20 18 10.2	4.563	15	6 59 42.02	2.1907	22 3 3.8	0.338
16	5 18 41.69	2.0937	20 22 41.2	4.471	16	7 1 53.49	2.1917	22 2 40.2	0.448
17	5 20 47.40	2.0965	20 27 6.7	4.378	17	7 4 5.02	2.1927	22 2 10.0	0.558
18	5 22 53.27	2.0992	20 31 26.6	4.285	18	7 6 16.61	2.1937	22 1 33.2	0.668
19	5 24 59.31	2.1020	20 35 40.9	4.192	19	7 8 28.26	2.1946	22 0 49.8	0.778
20	5 27 5.51	2.1047	20 39 49.6	4.098	20	7 10 39.96	2.1954	21 59 59.8	0.887
21	5 29 11.87	2.1074	20 43 52.7	4.004	21	7 12 51.71	2.1962	21 59 3.3	0.997
22	5 31 18.40	2.1101	20 47 50.1	3.909	22	7 15 3.51	2.1970	21 58 0.1	1.108
23	5 33 25.09	2.1128	N.20 51 41.8	3.813	23	7 17 15.35	2.1977	N.21 56 50.3	1.218
	MONDAY 14.					**WEDNESDAY 16.**			
0	5 35 31.93	2.1154	N.20 55 27.7	3.717	0	7 19 27.23	2.1983	N.21 55 33.9	1.328
1	5 37 38.93	2.1180	20 59 7.9	3.621	1	7 21 39.15	2.1989	21 54 10.9	1.439
2	5 39 46.09	2.1206	21 2 42.3	3.524	2	7 23 51.10	2.1994	21 52 41.2	1.550
3	5 41 53.40	2.1231	21 6 10.8	3.426	3	7 26 3.08	2.1999	21 51 4.9	1.660
4	5 44 0.86	2.1256	21 9 33.4	3.329	4	7 28 15.09	2.2003	21 49 22.0	1.771
5	5 46 8.47	2.1282	21 12 50.2	3.231	5	7 30 27.12	2.2007	21 47 32.4	1.882
6	5 48 16.24	2.1307	21 16 1.1	3.132	6	7 32 39.17	2.2010	21 45 36.2	1.992
7	5 50 24.16	2.1331	21 19 6.0	3.033	7	7 34 51.24	2.2012	21 43 33.4	2.102
8	5 52 32.22	2.1355	21 22 5.0	2.933	8	7 37 3.32	2.2015	21 41 24.0	2.212
9	5 54 40.42	2.1378	21 24 58.0	2.832	9	7 39 15.42	2.2017	21 39 7.9	2.323
10	5 56 48.76	2.1402	21 27 44.9	2.732	10	7 41 27.53	2.2018	21 36 45.2	2.433
11	5 58 57.24	2.1425	21 30 25.8	2.631	11	7 43 39.64	2.2018	21 34 15.9	2.543
12	6 1 5.86	2.1448	21 33 0.6	2.529	12	7 45 51.75	2.2018	21 31 40.0	2.653
13	6 3 14.62	2.1471	21 35 29.3	2.427	13	7 48 3.86	2.2018	21 28 57.5	2.763
14	6 5 23.51	2.1493	21 37 51.8	2.324	14	7 50 15.97	2.2018	21 26 8.4	2.873
15	6 7 32.53	2.1514	21 40 8.2	2.222	15	7 52 28.08	2.2017	21 23 12.7	2.983
16	6 9 41.68	2.1535	21 42 18.4	2.119	16	7 54 40.18	2.2015	21 20 10.5	3.092
17	6 11 50.95	2.1556	21 44 22.5	2.016	17	7 56 52.26	2.2013	21 17 1.7	3.202
18	6 14 0.35	2.1577	21 46 20.4	1.913	18	7 59 4.33	2.2011	21 13 46.3	3.311
19	6 16 9.87	2.1597	21 48 12.0	1.808	19	8 1 16.39	2.2008	21 10 24.4	3.419
20	6 18 19.51	2.1617	21 49 57.3	1.703	20	8 3 28.43	2.2004	21 6 56.0	3.528
21	6 20 29.27	2.1637	21 51 36.4	1.599	21	8 5 40.44	2.1999	21 3 21.0	3.637
22	6 22 39.15	2.1656	21 53 9.2	1.493	22	8 7 52.42	2.1994	20 59 39.5	3.746
23	6 24 49.14	2.1674	21 54 35.6	1.387	23	8 10 4.37	2.1989	20 55 51.5	3.854
24	6 26 59.24	2.1692	N.21 55 55.6	1.281	24	8 12 16.29	2.1984	N.20 51 57.0	3.963

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

THURSDAY 17.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	8 12 16.29	2.1984	N.20 51 57.0	3.969
1	8 14 28.18	2.1978	20 47 56.1	4.069
2	8 16 40.03	2.1972	20 43 48.7	4.177
3	8 18 51.84	2.1965	20 39 34.8	4.285
4	8 21 3.61	2.1958	20 35 14.5	4.391
5	8 23 15.34	2.1951	20 30 47.9	4.497
6	8 25 27.02	2.1943	20 26 14.9	4.603
7	8 27 38.65	2.1934	20 21 35.5	4.709
8	8 29 50.23	2.1926	20 16 49.8	4.815
9	8 32 1.76	2.1917	20 11 57.7	4.921
10	8 34 13.23	2.1907	20 6 59.3	5.025
11	8 36 24.64	2.1897	20 1 54.7	5.128
12	8 38 35.99	2.1887	19 56 43.9	5.232
13	8 40 47.28	2.1876	19 51 26.8	5.336
14	8 42 58.50	2.1865	19 46 3.5	5.440
15	8 45 9.66	2.1854	19 40 34.0	5.543
16	8 47 20.75	2.1842	19 34 58.3	5.646
17	8 49 31.77	2.1830	19 29 16.5	5.748
18	8 51 42.71	2.1817	19 23 28.6	5.849
19	8 53 53.58	2.1805	19 17 34.6	5.950
20	8 56 4.37	2.1792	19 11 34.6	6.051
21	8 58 15.09	2.1780	19 5 28.5	6.151
22	9 0 25.73	2.1767	18 59 16.5	6.250
23	9 2 36.29	2.1753	N.18 52 58.5	6.350

FRIDAY 18.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	9 4 46.76	2.1738	N.18 46 34.5	6.449
1	9 6 57.15	2.1724	18 40 4.6	6.547
2	9 9 7.45	2.1710	18 33 28.9	6.644
3	9 11 17.67	2.1696	18 26 47.3	6.741
4	9 13 27.80	2.1681	18 19 59.9	6.837
5	9 15 37.84	2.1666	18 13 6.8	6.933
6	9 17 47.79	2.1651	18 6 7.9	7.029
7	9 19 57.65	2.1635	17 59 3.3	7.124
8	9 22 7.41	2.1619	17 51 53.0	7.218
9	9 24 17.08	2.1604	17 44 37.1	7.311
10	9 26 26.66	2.1588	17 37 15.6	7.404
11	9 28 36.14	2.1573	17 29 48.6	7.497
12	9 30 45.53	2.1557	17 22 16.0	7.589
13	9 32 54.82	2.1540	17 14 37.9	7.680
14	9 35 4.01	2.1523	17 6 54.4	7.771
15	9 37 13.10	2.1507	16 59 5.4	7.861
16	9 39 22.09	2.1491	16 51 11.1	7.950
17	9 41 30.99	2.1475	16 43 11.4	8.039
18	9 43 39.79	2.1458	16 35 6.4	8.127
19	9 45 48.49	2.1441	16 26 56.1	8.215
20	9 47 57.09	2.1424	16 18 40.6	8.301
21	9 50 5.58	2.1407	16 10 20.0	8.387
22	9 52 13.97	2.1391	16 1 54.2	8.472
23	9 54 22.27	2.1375	15 53 23.3	8.557
24	9 56 30.47	2.1358	N.15 44 47.4	8.640

SATURDAY 19.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	9 56 30.47	2.1358	N.15 44 47.4	8.640
1	9 58 38.57	2.1341	15 36 6.5	8.723
2	10 0 46.56	2.1324	15 27 20.6	8.806
3	10 2 54.45	2.1308	15 18 29.7	8.889
4	10 5 2.25	2.1292	15 9 33.9	8.970
5	10 7 9.95	2.1275	15 0 33.3	9.049
6	10 9 17.55	2.1258	14 51 28.0	9.128
7	10 11 25.05	2.1242	14 42 17.9	9.207
8	10 13 32.45	2.1225	14 33 3.1	9.286
9	10 15 39.75	2.1209	14 23 43.6	9.363
10	10 17 46.96	2.1193	14 14 19.5	9.440
11	10 19 54.07	2.1177	14 4 50.8	9.516
12	10 22 1.08	2.1161	13 55 17.6	9.591
13	10 24 8.00	2.1146	13 45 39.9	9.665
14	10 26 14.83	2.1130	13 35 57.8	9.738
15	10 28 21.56	2.1114	13 26 11.3	9.811
16	10 30 28.20	2.1099	13 16 20.5	9.883
17	10 32 34.75	2.1084	13 6 25.4	9.954
18	10 34 41.21	2.1069	12 56 26.0	10.024
19	10 36 47.58	2.1055	12 46 22.5	10.093
20	10 38 53.87	2.1041	12 36 14.8	10.162
21	10 41 0.07	2.1027	12 26 3.0	10.230
22	10 43 6.19	2.1012	12 15 47.2	10.297
23	10 45 12.22	2.0998	N.12 5 27.3	10.364

SUNDAY 20.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	10 47 18.17	2.0985	N.11 55 3.5	10.429
1	10 49 24.04	2.0972	11 44 35.8	10.494
2	10 51 29.83	2.0959	11 34 4.2	10.557
3	10 53 35.54	2.0946	11 23 28.9	10.620
4	10 55 41.18	2.0934	11 12 49.8	10.682
5	10 57 46.75	2.0921	11 2 7.0	10.743
6	10 59 52.24	2.0909	10 51 20.6	10.803
7	11 1 57.66	2.0898	10 40 30.6	10.863
8	11 4 3.01	2.0887	10 29 37.0	10.922
9	11 6 8.30	2.0877	10 18 39.9	10.981
10	11 8 13.53	2.0866	10 7 39.3	11.038
11	11 10 18.69	2.0855	9 56 35.4	11.093
12	11 12 23.79	2.0845	9 45 28.2	11.148
13	11 14 28.83	2.0836	9 34 17.7	11.203
14	11 16 33.82	2.0827	9 23 3.9	11.257
15	11 18 38.75	2.0818	9 11 46.9	11.309
16	11 20 43.63	2.0809	9 0 26.8	11.361
17	11 22 48.46	2.0801	8 49 3.6	11.412
18	11 24 53.25	2.0794	8 37 37.4	11.461
19	11 26 57.99	2.0787	8 26 8.3	11.510
20	11 29 2.69	2.0780	8 14 36.2	11.559
21	11 31 7.35	2.0773	8 3 1.2	11.607
22	11 33 11.97	2.0767	7 51 23.4	11.653
23	11 35 16.56	2.0762	7 39 42.8	11.699
24	11 37 21.12	2.0757	N. 7 27 59.5	11.743

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	MONDAY 21.					**WEDNESDAY 23.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	11 37 21.12	2.0757	N. 7 27 59.5	11.743	0	13 17 22.14	2.1133	S. 2 29 6.7	12.755
1	11 39 25.65	2.0752	7 16 13.6	11.787	1	13 19 29.00	2.1155	2 41 51.9	12.752
2	11 41 30.15	2.0748	7 4 25.1	11.829	2	13 21 36.00	2.1178	2 54 36.9	12.747
3	11 43 34.63	2.0745	6 52 34.1	11.871	3	13 23 43.14	2.1202	3 7 21.5	12.740
4	11 45 39.09	2.0741	6 40 40.6	11.912	4	13 25 50.42	2.1226	3 20 5.7	12.732
5	11 47 43.53	2.0738	6 28 44.6	11.953	5	13 27 57.85	2.1251	3 32 49.4	12.724
6	11 49 47.95	2.0736	6 16 46.2	11.992	6	13 30 5.43	2.1276	3 45 32.6	12.715
7	11 51 52.36	2.0734	6 4 45.5	12.030	7	13 32 13.16	2.1302	3 58 15.2	12.704
8	11 53 56.76	2.0733	5 52 42.6	12.067	8	13 34 21.05	2.1329	4 10 57.1	12.692
9	11 56 1.16	2.0732	5 40 37.5	12.103	9	13 36 29.11	2.1356	4 23 38.2	12.679
10	11 58 5.55	2.0732	5 28 30.2	12.138	10	13 38 37.33	2.1384	4 36 18.5	12.665
11	12 0 9.94	2.0732	5 16 20.9	12.173	11	13 40 45.72	2.1413	4 48 58.0	12.650
12	12 2 14.33	2.0733	5 4 9.5	12.207	12	13 42 54.28	2.1441	5 1 36.5	12.632
13	12 4 18.73	2.0734	4 51 56.1	12.239	13	13 45 3.01	2.1471	5 14 13.9	12.614
14	12 6 23.14	2.0736	4 39 40.8	12.271	14	13 47 11.93	2.1502	5 26 50.2	12.596
15	12 8 27.56	2.0738	4 27 23.6	12.302	15	13 49 21.03	2.1533	5 39 25.4	12.577
16	12 10 31.99	2.0740	4 15 4.6	12.332	16	13 51 30.32	2.1564	5 51 59.4	12.556
17	12 12 36.44	2.0744	4 2 43.8	12.360	17	13 53 39.80	2.1596	6 4 32.1	12.533
18	12 14 40.92	2.0748	3 50 21.4	12.388	18	13 55 49.47	2.1628	6 17 3.4	12.509
19	12 16 45.42	2.0752	3 37 57.3	12.415	19	13 57 59.34	2.1662	6 29 33.2	12.484
20	12 18 49.95	2.0757	3 25 31.6	12.441	20	14 0 9.41	2.1696	6 42 1.5	12.458
21	12 20 54.51	2.0763	3 13 4.4	12.466	21	14 2 19.69	2.1730	6 54 28.2	12.431
22	12 22 59.11	2.0769	3 0 35.7	12.490	22	14 4 30.17	2.1765	7 6 53.2	12.402
23	12 25 3.74	2.0775	N. 2 48 5.6	12.512	23	14 6 40.87	2.1801	S. 7 19 16.5	12.373
	TUESDAY 22.					**THURSDAY 24.**			
0	12 27 8.41	2.0783	N. 2 35 34.2	12.534	0	14 8 51.78	2.1837	S. 7 31 38.0	12.342
1	12 29 13.13	2.0791	2 23 1.5	12.555	1	14 11 2.91	2.1873	7 43 57.6	12.310
2	12 31 17.90	2.0799	2 10 27.6	12.575	2	14 13 14.26	2.1911	7 56 15.2	12.276
3	12 33 22.72	2.0808	1 57 52.5	12.594	3	14 15 25.84	2.1949	8 8 30.7	12.241
4	12 35 27.59	2.0817	1 45 16.3	12.612	4	14 17 37.65	2.1987	8 20 44.1	12.205
5	12 37 32.52	2.0827	1 32 39.0	12.630	5	14 19 49.69	2.2027	8 32 55.3	12.168
6	12 39 37.51	2.0838	1 20 0.7	12.646	6	14 22 1.97	2.2067	8 45 4.3	12.130
7	12 41 42.57	2.0849	1 7 21.5	12.661	7	14 24 14.49	2.2107	8 57 10.9	12.090
8	12 43 47.70	2.0861	0 54 41.4	12.674	8	14 26 27.25	2.2147	9 9 15.1	12.048
9	12 45 52.90	2.0873	0 42 0.6	12.687	9	14 28 40.26	2.2188	9 21 16.7	12.005
10	12 47 58.18	2.0886	0 29 19.0	12.699	10	14 30 53.51	2.2229	9 33 15.7	11.962
11	12 50 3.54	2.0900	0 16 36.7	12.710	11	14 33 7.01	2.2271	9 45 12.1	11.918
12	12 52 8.98	2.0914	N. 0 3 53.8	12.719	12	14 35 20.76	2.2313	9 57 5.8	11.872
13	12 54 14.51	2.0929	S. 0 8 49.6	12.728	13	14 37 34.77	2.2357	10 8 56.7	11.824
14	12 56 20.13	2.0944	0 21 33.6	12.736	14	14 39 49.04	2.2401	10 20 44.7	11.775
15	12 58 25.84	2.0960	0 34 18.0	12.743	15	14 42 3.58	2.2446	10 32 29.7	11.724
16	13 0 31.65	2.0977	0 47 2.8	12.748	16	14 44 18.39	2.2491	10 44 11.6	11.672
17	13 2 37.57	2.0995	0 59 47.9	12.753	17	14 46 33.47	2.2536	10 55 50.3	11.618
18	13 4 43.59	2.1013	1 12 33.2	12.757	18	14 48 48.82	2.2581	11 7 25.8	11.564
19	13 6 49.72	2.1031	1 25 18.7	12.759	19	14 51 4.44	2.2627	11 18 58.0	11.508
20	13 8 55.96	2.1050	1 38 4.3	12.761	20	14 53 20.34	2.2673	11 30 26.8	11.452
21	13 11 2.32	2.1070	1 50 50.0	12.762	21	14 55 36.52	2.2720	11 41 52.2	11.393
22	13 13 8.80	2.1091	2 3 35.7	12.761	22	14 57 52.98	2.2767	11 53 14.0	11.333
23	13 15 15.41	2.1112	2 16 21.3	12.758	23	15 0 9.73	2.2815	12 4 32.2	11.272
24	13 17 22.14	2.1133	S. 2 29 6.7	12.755	24	15 2 26.76	2.2863	S. 12 15 46.7	11.210

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	FRIDAY 25.					**SUNDAY 27.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	15 2 26.76	2.2863	S. 12 15 46.7	11.210	0	16 58 3.10	2.5282	S. 19 34 51.9	6.540
1	15 4 44.08	2.2911	12 26 57.4	11.146	1	17 0 34.93	2.5327	19 41 21.0	6.419
2	15 7 1.69	2.2959	12 38 4.2	11.080	2	17 3 7.02	2.5370	19 47 42.2	6.288
3	15 9 19.59	2.3008	12 49 7.0	11.013	3	17 5 39.37	2.5413	19 53 55.5	6.156
4	15 11 37.79	2.3058	13 0 5.8	10.945	4	17 8 11.98	2.5456	20 0 0.9	6.023
5	15 13 56.29	2.3108	13 11 0.4	10.875	5	17 10 44.85	2.5499	20 5 58.2	5.888
6	15 16 15.09	2.3158	13 21 50.8	10.804	6	17 13 17.97	2.5540	20 11 47.4	5.753
7	15 18 34.19	2.3208	13 32 36.9	10.732	7	17 15 51.33	2.5579	20 17 28.5	5.616
8	15 20 53.59	2.3258	13 43 18.6	10.658	8	17 18 24.92	2.5618	20 23 1.3	5.477
9	15 23 13.29	2.3309	13 53 55.9	10.583	9	17 20 58.74	2.5656	20 28 25.7	5.337
10	15 25 33.30	2.3361	14 4 28.6	10.507	10	17 23 32.79	2.5694	20 33 41.7	5.197
11	15 27 53.62	2.3412	14 14 56.7	10.428	11	17 26 7.07	2.5732	20 38 49.3	5.056
12	15 30 14.24	2.3463	14 25 20.0	10.348	12	17 28 41.57	2.5768	20 43 48.4	4.913
13	15 32 35.17	2.3514	14 35 38.5	10.267	13	17 31 16.28	2.5803	20 48 38.9	4.770
14	15 34 56.41	2.3566	14 45 52.1	10.185	14	17 33 51.20	2.5837	20 53 20.8	4.627
15	15 37 17.96	2.3618	14 56 0.7	10.102	15	17 36 26.32	2.5869	20 57 54.1	4.483
16	15 39 39.83	2.3671	15 6 4.3	10.017	16	17 39 1.63	2.5901	21 2 18.7	4.338
17	15 42 2.01	2.3723	15 16 2.7	9.929	17	17 41 37.13	2.5932	21 6 34.6	4.192
18	15 44 24.50	2.3775	15 25 55.8	9.841	18	17 44 12.82	2.5962	21 10 41.7	4.044
19	15 46 47.31	2.3827	15 35 43.6	9.752	19	17 46 48.68	2.5991	21 14 39.9	3.895
20	15 49 10.43	2.3879	15 45 26.0	9.661	20	17 49 24.71	2.6019	21 18 29.1	3.746
21	15 51 33.86	2.3932	15 55 2.9	9.568	21	17 52 0.91	2.6047	21 22 9.4	3.597
22	15 53 57.61	2.3985	16 4 34.2	9.474	22	17 54 37.27	2.6073	21 25 40.7	3.446
23	15 56 21.68	2.4037	S. 16 13 59.8	9.379	23	17 57 13.78	2.6097	S. 21 29 2.9	3.294
	SATURDAY 26.					**MONDAY 28.**			
0	15 58 46.06	2.4090	S. 16 23 19.7	9.282	0	17 59 50.43	2.6120	S. 21 32 16.0	3.142
1	16 1 10.76	2.4142	16 32 33.7	9.184	1	18 2 27.22	2.6142	21 35 20.0	2.990
2	16 3 35.77	2.4194	16 41 41.8	9.085	2	18 5 4.14	2.6164	21 38 14.8	2.837
3	16 6 1.09	2.4246	16 50 43.9	8.984	3	18 7 41.19	2.6184	21 41 0.4	2.683
4	16 8 26.72	2.4298	16 59 39.9	8.882	4	18 10 18.35	2.6202	21 43 36.8	2.530
5	16 10 52.67	2.4351	17 8 29.7	8.778	5	18 12 55.62	2.6220	21 46 4.0	2.376
6	16 13 18.93	2.4403	17 17 13.3	8.673	6	18 15 32.99	2.6237	21 48 21.9	2.220
7	16 15 45.50	2.4454	17 25 50.5	8.567	7	18 18 10.46	2.6252	21 50 30.4	2.064
8	16 18 12.38	2.4506	17 34 21.3	8.458	8	18 20 48.01	2.6265	21 52 29.6	1.908
9	16 20 39.57	2.4557	17 42 45.5	8.348	9	18 23 25.64	2.6277	21 54 19.4	1.752
10	16 23 7.07	2.4608	17 51 3.1	8.238	10	18 26 3.34	2.6289	21 55 59.9	1.596
11	16 25 34.87	2.4658	17 59 14.1	8.127	11	18 28 41.11	2.6299	21 57 30.9	1.439
12	16 28 2.97	2.4709	18 7 18.3	8.013	12	18 31 18.93	2.6307	21 58 52.5	1.282
13	16 30 31.38	2.4760	18 15 15.7	7.898	13	18 33 56.80	2.6315	22 0 4.7	1.124
14	16 33 0.09	2.4810	18 23 6.1	7.782	14	18 36 34.71	2.6322	22 1 7.4	0.966
15	16 35 29.10	2.4859	18 30 49.5	7.664	15	18 39 12.66	2.6327	22 2 0.6	0.808
16	16 37 58.40	2.4907	18 38 25.8	7.546	16	18 41 50.63	2.6330	22 2 44.3	0.650
17	16 40 27.99	2.4956	18 45 55.0	7.426	17	18 44 28.62	2.6332	22 3 18.6	0.492
18	16 42 57.87	2.5004	18 53 16.9	7.304	18	18 47 6.61	2.6332	22 3 43.4	0.334
19	16 45 28.04	2.5052	19 0 31.5	7.182	19	18 49 44.60	2.6331	22 3 58.7	0.176
20	16 47 58.49	2.5099	19 7 38.7	7.058	20	18 52 22.58	2.6329	22 4 4.5	− 0.018
21	16 50 29.23	2.5146	19 14 38.4	6.933	21	18 55 0.55	2.6327	22 4 0.8	+ 0.140
22	16 53 0.25	2.5192	19 21 30.6	6.806	22	18 57 38.50	2.6323	22 3 47.7	0.298
23	16 55 31.54	2.5237	19 28 15.1	6.678	23	19 0 16.42	2.6317	22 3 25.1	0.456
24	16 58 3.10	2.5282	S. 19 34 51.9	6.549	24	19 2 54.30	2.6309	S. 22 2 53.0	0.614

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

TUESDAY 29.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	19 2 54.30	2.6309	S.22 2 53.0	0.614
1	19 5 32.13	2.6300	22 2 11.4	0.772
2	19 8 9.90	2.6290	22 1 20.4	0.929
3	19 10 47.61	2.6279	22 0 20.0	1.086
4	19 13 25.25	2.6267	21 59 10.1	1.243
5	19 16 2.81	2.6253	21 57 50.8	1.399
6	19 18 40.28	2.6238	21 56 22.2	1.555
7	19 21 17.66	2.6221	21 54 44.2	1.711
8	19 23 54.93	2.6202	21 52 56.9	1.866
9	19 26 32.09	2.6183	21 51 0.3	2.021
10	19 29 9.13	2.6163	21 48 54.4	2.175
11	19 31 46.05	2.6141	21 46 39.3	2.329
12	19 34 22.83	2.6118	21 44 14.9	2.483
13	19 36 59.47	2.6094	21 41 41.3	2.636
14	19 39 35.96	2.6069	21 38 58.6	2.787
15	19 42 12.30	2.6042	21 36 6.9	2.938
16	19 44 48.47	2.6014	21 33 6.1	3.088
17	19 47 24.47	2.5986	21 29 56.3	3.239
18	19 50 0.30	2.5956	21 26 37.4	3.389
19	19 52 35.94	2.5924	21 23 9.6	3.537
20	19 55 11.39	2.5892	21 19 33.0	3.684
21	19 57 46.64	2.5858	21 15 47.5	3.831
22	20 0 21.69	2.5823	21 11 53.2	3.977
23	20 2 56.52	2.5787	S.21 7 50.2	4.122

WEDNESDAY 30.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	20 5 31.13	2.5750	S.21 3 38.6	4.265
1	20 8 5.52	2.5712	20 59 18.4	4.408
2	20 10 39.68	2.5674	20 54 49.6	4.551
3	20 13 13.61	2.5634	20 50 12.2	4.693
4	20 15 47.29	2.5593	20 45 26.4	4.833
5	20 18 20.72	2.5551	20 40 32.2	4.972
6	20 20 53.90	2.5508	20 35 29.7	5.110
7	20 23 26.82	2.5465	20 30 19.0	5.246
8	20 25 59.48	2.5420	20 25 0.2	5.381
9	20 28 31.86	2.5374	20 19 33.3	5.516
10	20 31 3.97	2.5328	20 13 58.3	5.650
11	20 33 35.80	2.5281	20 8 15.3	5.782
12	20 36 7.34	2.5233	20 2 24.4	5.913
13	20 38 38.59	2.5184	19 56 25.7	6.043
14	20 41 9.55	2.5135	19 50 19.2	6.171
15	20 43 40.21	2.5085	19 44 5.1	6.298
16	20 46 10.57	2.5034	19 37 43.4	6.425
17	20 48 40.62	2.4982	19 31 14.1	6.550
18	20 51 10.36	2.4930	19 24 37.4	6.673
19	20 53 39.78	2.4877	19 17 53.4	6.795
20	20 56 8.88	2.4823	19 11 2.0	6.916
21	20 58 37.66	2.4770	19 4 3.4	7.036
22	21 1 6.12	2.4716	18 56 57.7	7.153
23	21 3 34.25	2.4661	18 49 45.0	7.270
24	21 6 2.05	2.4605	S.18 42 25.3	7.386

THURSDAY 31.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	21 6 2.05	2.4605	S.18 42 25.3	7.386
1	21 8 29.51	2.4548	18 34 58.7	7.499
2	21 10 56.63	2.4492	18 27 25.4	7.611
3	21 13 23.41	2.4435	18 19 45.4	7.722
4	21 15 49.85	2.4378	18 11 58.7	7.832
5	21 18 15.95	2.4321	18 4 5.5	7.940
6	21 20 41.70	2.4263	17 56 5.9	8.047
7	21 23 7.10	2.4204	17 47 59.9	8.152
8	21 25 32.15	2.4145	17 39 47.6	8.256
9	21 27 56.84	2.4086	17 31 29.2	8.358
10	21 30 21.18	2.4027	17 23 4.7	8.458
11	21 32 45.16	2.3967	17 14 34.2	8.558
12	21 35 8.79	2.3908	17 5 57.7	8.657
13	21 37 32.06	2.3848	16 57 15.4	8.753
14	21 39 54.97	2.3788	16 48 27.4	8.847
15	21 42 17.52	2.3728	16 39 33.8	8.940
16	21 44 39.71	2.3667	16 30 34.6	9.032
17	21 47 1.53	2.3607	16 21 29.9	9.123
18	21 49 22.99	2.3547	16 12 19.8	9.212
19	21 51 44.09	2.3487	16 3 4.5	9.299
20	21 54 4.83	2.3426	15 53 44.0	9.385
21	21 56 25.20	2.3365	15 44 18.3	9.470
22	21 58 45.21	2.3304	15 34 47.6	9.553
23	22 1 4.85	2.3243	S.15 25 12.0	9.634

FRIDAY, FEBRUARY 1.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	22 3 24.13	2.3183	S.15 15 31.5	9.714

PHASES OF THE MOON.

		d	h	m
● New Moon . .	Jan.	1	9	8.1
☽ First Quarter . . .		8	12	40.6
○ Full Moon		16	17	36.8
☾ Last Quarter. . . .		24	3	57.2
● New Moon		30	21	9.9

		d	h
☾ Apogee. . . .	Jan.	12	5.4
☾ Perigee.		28	7.2

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
3	Sun	W.	22° 11′ 8″	2518	23° 51′ 56″	2534	25° 32′ 22″	2550	27° 12′ 26″	2566
	α Pegasi	E.	50 0 59	2938	48 29 28	2995	46 59 9	3058	45 30 8	3127
	α Arietis	E.	90 48 0	2351	89 3 15	2366	87 18 51	2382	85 34 50	2398
4	Sun	W.	35 26 45	2657	37 4 22	2677	38 41 33	2696	40 18 18	2715
	α Arietis	E.	77 1 3	2492	75 19 38	2512	73 38 41	2533	71 58 14	2555
	Aldebaran	E.	108 6 47	2333	106 21 35	2350	104 36 49	2368	102 52 29	2387
5	Sun	W.	48 15 32	2816	49 49 39	2836	51 23 20	2856	52 56 35	2876
	α Arietis	E.	63 43 39	2671	62 6 20	2696	60 29 35	2722	58 53 24	2747
	Aldebaran	E.	94 17 23	2480	92 35 41	2499	90 54 26	2517	89 13 37	2535
6	Sun	W.	60 36 23	2977	62 7 5	2997	63 37 22	3016	65 7 15	3034
	Mars	W.	19 37 14	2913	21 9 16	2930	22 40 57	2947	24 12 16	2965
	Venus	W.	18 11 15	3047	19 40 30	3065	21 9 23	3083	22 37 54	3101
	α Arietis	E.	51 1 23	2891	49 28 52	2922	47 57 1	2954	46 25 51	2988
	Aldebaran	E.	80 55 57	2629	79 17 41	2647	77 39 50	2665	76 2 23	2682
7	Sun	W.	72 30 54	3127	73 58 31	3144	75 25 47	3162	76 52 42	3178
	Mars	W.	31 43 31	3049	33 12 43	3065	34 41 35	3082	36 10 7	3097
	Fomalhaut	W.	31 17 54	3623	32 36 4	3567	33 55 14	3522	35 15 14	3483
	Venus	W.	29 54 58	3190	31 21 19	3208	32 47 19	3225	34 12 59	3241
	α Arietis	E.	39 1 12	3186	37 34 46	3233	36 9 16	3284	34 44 46	3341
	Aldebaran	E.	68 0 56	2768	66 25 46	2784	64 50 57	2799	63 16 28	2815
8	Sun	W.	84 2 28	3256	85 27 31	3270	86 52 18	3284	88 16 48	3297
	Mars	W.	43 28 6	3172	44 54 49	3186	46 21 15	3198	47 47 26	3212
	Fomalhaut	W.	42 4 6	3364	43 27 4	3350	44 50 18	3338	46 13 45	3330
	Venus	W.	41 16 37	3319	42 40 27	3332	44 4 1	3346	45 27 19	3359
	Aldebaran	E.	55 28 57	2887	53 56 22	2900	52 24 3	2913	50 52 1	2925
	Pollux	E.	99 42 31	2913	98 10 29	2926	96 38 43	2939	95 7 13	2950
9	Sun	W.	95 15 39	3357	96 38 45	3367	98 1 39	3377	99 24 22	3386
	Mars	W.	54 54 41	3269	56 19 29	3279	57 44 5	3289	59 8 29	3299
	Fomalhaut	W.	53 13 4	3303	54 37 12	3301	56 1 22	3299	57 25 35	3297
	Venus	W.	52 20 11	3419	53 42 6	3429	55 3 50	3439	56 25 22	3449
	α Pegasi	W.	40 40 35	4016	41 51 59	3965	43 4 13	3920	44 17 12	3880
	Aldebaran	E.	43 15 33	2981	41 44 56	2990	40 14 31	3001	38 44 19	3010
	Pollux	E.	87 33 21	3005	86 3 14	3015	84 33 20	3024	83 3 37	3033
10	Sun	W.	106 15 27	3426	107 37 14	3432	108 58 54	3438	110 20 28	3443
	Mars	W.	66 8 2	3337	67 31 31	3343	68 54 53	3348	70 18 9	3353
	Fomalhaut	W.	64 26 56	3295	65 51 13	3294	67 15 31	3294	68 39 49	3294
	Venus	W.	63 10 34	3488	64 31 11	3495	65 51 41	3500	67 12 5	3506
	α Pegasi	W.	50 31 9	3731	51 47 23	3709	53 4 0	3689	54 20 59	3671
	Aldebaran	E.	31 15 55	3048	29 46 42	3055	28 17 37	3061	26 48 40	3067
	Pollux	E.	75 37 35	3070	74 8 49	3077	72 40 11	3082	71 11 40	3088
11	Sun	W.	117 6 58	3462	118 28 4	3465	119 49 7	3467	121 10 8	3469
	Mars	W.	77 13 9	3372	78 35 57	3375	79 58 42	3377	81 21 25	3379
	Fomalhaut	W.	75 41 18	3294	77 5 36	3294	78 29 55	3294	79 54 14	3293
	Venus	W.	73 52 45	3525	75 12 42	3527	76 32 36	3530	77 52 27	3532

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ′ ″		° ′ ″		° ′ ″		° ′ ″	
3	Sun	W.	28 52 7	2584	30 31 24	2602	32 10 16	2621	33 48 43	2639
	α Pegasi	E.	44 2 31	3303	42 36 25	3365	41 11 56	3377	39 49 13	3479
	α Arietis	E.	83 51 13	2416	82 8 1	2434	80 25 15	2453	78 42 55	2472
4	Sun	W.	41 54 38	2735	43 30 32	2755	45 5 59	2775	46 40 59	2796
	α Arietis	E.	70 18 17	2577	68 38 51	2599	66 59 55	2623	65 21 31	2646
	Aldebaran	E.	101 8 35	2405	99 25 7	2424	97 42 6	2442	95 59 31	2461
5	Sun	W.	54 29 24	2897	56 1 47	2917	57 33 44	2937	59 5 16	2957
	α Arietis	E.	57 17 47	2775	55 42 46	2802	54 8 21	2831	52 34 33	2860
	Aldebaran	E.	87 33 13	2555	85 53 16	2573	84 13 44	2592	82 34 38	2610
6	Sun	W.	66 36 45	3054	68 5 51	3073	69 34 34	3091	71 2 55	3109
	Mars	W.	25 43 13	2961	27 13 49	2998	28 44 4	3015	30 13 58	3032
	Venus	W.	24 6 2	3119	25 33 48	3137	27 1 13	3155	28 28 16	3173
	α Arietis	E.	44 55 23	3023	43 25 39	3060	41 56 41	3100	40 28 31	3142
	Aldebaran	E.	74 25 19	2700	72 48 39	2717	71 12 22	2735	69 36 28	2751
7	Sun	W.	78 19 17	3194	79 45 33	3210	81 11 30	3226	82 37 8	3242
	Mars	W.	37 38 20	3113	39 6 14	3129	40 33 49	3143	42 1 6	3158
	Fomalhaut	W.	36 35 57	3450	37 57 17	3423	39 19 8	3399	40 41 26	3379
	Venus	W.	35 38 20	3257	37 3 22	3273	38 28 5	3288	39 52 30	3304
	α Arietis	E.	33 21 22	3402	31 59 8	3469	30 38 9	3543	29 18 32	3627
	Aldebaran	E.	61 42 19	2830	60 8 30	2845	58 35 1	2859	57 1 50	2873
8	Sun	W.	89 41 3	3310	91 5 3	3322	92 28 49	3334	93 52 21	3346
	Mars	W.	49 13 21	3225	50 39 1	3236	52 4 27	3247	53 29 40	3258
	Fomalhaut	W.	47 37 22	3322	49 1 8	3316	50 25 1	3311	51 49 0	3306
	Venus	W.	46 50 22	3372	48 13 10	3385	49 35 44	3397	50 58 4	3408
	Aldebaran	E.	49 20 14	2937	47 48 42	2949	46 17 25	2960	44 46 22	2971
	Pollux	E.	93 35 58	2962	92 4 58	2973	90 34 12	2985	89 3 40	2995
9	Sun	W.	100 46 54	3395	102 9 16	3404	103 31 28	3411	104 53 32	3419
	Mars	W.	60 32 42	3307	61 56 45	3315	63 20 39	3322	64 44 25	3330
	Fomalhaut	W.	58 49 50	3296	60 14 6	3296	61 38 22	3295	63 2 39	3295
	Venus	W.	57 46 43	3458	59 7 54	3466	60 28 56	3474	61 49 49	3481
	α Pegasi	W.	45 30 52	3844	46 45 9	3812	47 59 59	3782	49 15 20	3755
	Aldebaran	E.	37 14 19	3018	35 44 29	3026	34 14 48	3034	32 45 17	3041
	Pollux	E.	81 34 5	3041	80 4 43	3049	78 35 31	3057	77 6 29	3064
10	Sun	W.	111 41 56	3448	113 3 18	3453	114 24 35	3456	115 45 48	3459
	Mars	W.	71 41 19	3358	73 4 23	3363	74 27 22	3366	75 50 17	3369
	Fomalhaut	W.	70 4 7	3295	71 28 24	3294	72 52 42	3294	74 17 0	3294
	Venus	W.	68 32 23	3511	69 52 35	3515	71 12 42	3519	72 32 45	3522
	α Pegasi	W.	55 38 17	3654	56 55 53	3637	58 13 47	3623	59 31 57	3610
	Aldebaran	E.	25 19 50	3073	23 51 8	3079	22 22 33	3084	20 54 4	3089
	Pollux	E.	69 43 16	3093	68 14 58	3098	66 46 46	3102	65 18 39	3106
11	Sun	W.	122 31 7	3470	123 52 5	3470	125 13 3	3471	126 34 0	3471
	Mars	W.	82 44 6	3379	84 6 46	3380	85 29 25	3380	86 52 4	3380
	Fomalhaut	W.	81 18 34	3293	82 42 54	3292	84 7 15	3290	85 31 38	3288
	Venus	W.	79 12 16	3533	80 32 4	3533	81 51 52	3533	83 11 40	3533

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	III^{h}.	P. L. of Diff.	VI^{h}.	P. L. of Diff.	IX^{h}.	P. L. of Diff.
11	α Pegasi	W.	60° 50′ 21″	3598	62° 8′ 58″	3586	63° 27′ 48″	3574	64° 46′ 51″	3563
	Pollux	E.	63 50 37	3110	62 22 39	3113	60 54 45	3115	59 26 54	3119
	SATURN	E.	90 10 42	3050	88 41 31	3052	87 12 22	3054	85 43 16	3056
12	SUN	W.	127 54 57	3470	129 15 55	3469	130 36 54	3467	131 57 55	3466
	Fomalhaut	W.	86 56 3	3288	88 20 29	3287	89 44 56	3286	91 9 24	3284
	VENUS	W.	84 31 28	3532	85 51 17	3531	87 11 7	3529	88 30 59	3528
	α Pegasi	W.	71 24 47	3518	72 44 51	3510	74 5 4	3502	75 25 26	3495
	Pollux	E.	52 8 23	3127	50 40 46	3129	49 13 11	3129	47 45 37	3130
	SATURN	E.	78 18 0	3056	76 48 56	3055	75 19 51	3054	73 50 45	3052
	Regulus	E.	87 44 40	3065	86 16 12	3063	84 47 42	3062	83 19 11	3061
13	Fomalhaut	W.	98 12 13	3276	99 36 52	3274	101 1 34	3272	102 26 18	3271
	VENUS	W.	95 10 55	3513	96 31 5	3509	97 51 19	3505	99 11 38	3500
	α Pegasi	W.	82 9 10	3462	83 30 17	3456	84 51 30	3451	86 12 49	3445
	α Arietis	W.	38 31 7	3465	39 52 10	3438	41 13 44	3413	42 35 46	3389
	Pollux	E.	40 28 0	3134	39 0 32	3135	37 33 5	3137	36 5 40	3138
	SATURN	E.	66 24 34	3039	64 55 9	3035	63 25 40	3031	61 56 6	3026
	Regulus	E.	75 55 57	3068	74 27 8	3065	72 58 15	3060	71 29 17	3056
14	α Arietis	W.	49 32 13	3290	50 56 36	3274	52 21 18	3258	53 46 19	3243
	Aldebaran	W.	16 17 46	3053	17 46 53	3043	19 16 12	3034	20 45 42	3026
	Pollux	E.	28 49 24	3160	27 22 27	3168	25 55 40	3180	24 29 7	3194
	SATURN	E.	54 26 52	3002	52 56 42	2997	51 26 26	2992	49 56 3	2985
	Regulus	E.	64 3 6	3032	62 33 33	3027	61 3 54	3022	59 34 8	3016
15	α Arietis	W.	60 55 36	3174	62 22 16	3163	63 49 10	3151	65 16 18	3139
	Aldebaran	W.	28 15 45	2986	29 46 15	2978	31 16 55	2970	32 47 45	2963
	SATURN	E.	42 22 11	2954	40 51 0	2946	39 19 40	2940	37 48 12	2933
	Regulus	E.	52 3 27	2985	50 32 55	2978	49 2 15	2971	47 31 26	2965
	Spica	E.	105 57 53	3015	104 27 59	3007	102 57 55	3000	101 27 42	2993
16	α Arietis	W.	72 35 25	3084	74 3 51	3073	75 32 36	3064	77 1 30	3054
	Aldebaran	W.	40 24 21	2924	41 56 10	2915	43 28 10	2907	45 0 20	2899
	SATURN	E.	30 8 37	2898	28 36 15	2890	27 3 43	2883	25 31 2	2875
	Regulus	E.	39 55 14	2930	38 23 33	2924	36 51 44	2916	35 19 46	2910
	Spica	E.	93 54 14	2954	92 23 3	2946	90 51 42	2939	89 20 12	2931
17	α Arietis	W.	84 28 57	3007	85 59 1	2999	87 29 15	2990	88 59 40	2982
	Aldebaran	W.	52 43 46	2858	54 16 59	2850	55 50 22	2842	57 23 56	2833
	Regulus	E.	27 37 52	2879	26 5 6	2873	24 32 13	2869	22 59 14	2864
	Spica	E.	81 40 10	2891	80 7 39	2883	78 34 59	2876	77 2 9	2868
18	Aldebaran	W.	65 14 28	2792	66 49 7	2783	68 23 57	2775	69 58 58	2767
	Pollux	W.	21 53 25	2993	23 23 47	2960	24 54 50	2931	26 26 29	2906
	Spica	E.	69 15 31	2831	67 41 43	2823	66 7 45	2816	64 33 38	2808
	Antares	E.	115 8 41	2842	113 35 8	2833	112 1 23	2824	110 27 26	2814
19	Aldebaran	W.	77 56 44	2725	79 32 50	2716	81 9 8	2708	82 45 37	2701
	Pollux	W.	34 11 45	2812	35 45 57	2798	37 20 28	2783	38 55 18	2769
	Spica	E.	56 40 45	2775	55 5 45	2769	53 30 36	2763	51 55 19	2757
	Antares	E.	102 34 39	2769	100 59 30	2760	99 24 10	2751	97 48 38	2743

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P.L. of Diff.	XVh.	P.L. of Diff.	XVIIIh.	P.L. of Diff.	XXIh.	P.L. of Diff.
11	α Pegasi	W.	66° 6′ 6″	3553	67° 25′ 32″	3544	68° 45′ 8″	3535	70° 4′ 53″	3527
	Pollux	E.	57 59 7	3191	56 31 23	3193	55 3 41	3194	53 36 1	3196
	Saturn	E.	84 14 12	3056	82 45 9	3056	81 16 6	3056	79 47 3	3056
12	Sun	W.	133 18 57	3464	134 40 1	3461	136 1 9	3457	137 22 21	3454
	Fomalhaut	W.	92 33 54	3982	93 58 26	3981	95 23 0	3979	96 47 36	3978
	Venus	W.	89 50 52	3525	91 10 48	3523	92 30 47	3520	93 50 49	3516
	α Pegasi	W.	76 45 56	3488	78 6 33	3481	79 27 18	3475	80 48 10	3468
	Pollux	E.	46 18 4	3131	44 50 32	3131	43 23 0	3132	41 55 29	3133
	Saturn	E.	72 21 37	3050	70 52 26	3047	69 23 12	3045	67 53 55	3042
	Regulus	E.	81 50 38	3079	80 22 3	3077	78 53 25	3073	77 24 43	3070
13	Fomalhaut	W.	103 51 3	3970	105 15 50	3968	106 40 39	3966	108 5 30	3965
	Venus	W.	100 32 2	3496	101 52 31	3490	103 13 6	3485	104 33 47	3479
	α Pegasi	W.	87 34 15	3439	88 55 47	3435	90 17 24	3430	91 39 7	3425
	α Arietis	W.	43 58 15	3366	45 21 10	3345	46 44 29	3326	48 8 10	3307
	Pollux	E.	34 38 17	3141	33 10 57	3144	31 43 41	3148	30 16 29	3153
	Saturn	E.	60 26 26	3022	58 56 41	3018	57 26 51	3014	55 56 55	3008
	Regulus	E.	70 0 14	3052	68 31 6	3047	67 1 52	3043	65 32 32	3038
14	α Arietis	W.	55 11 37	3229	56 37 12	3214	58 3 4	3201	59 29 12	3188
	Aldebaran	W.	22 15 23	3018	23 45 14	3009	25 15 15	3002	26 45 25	2994
	Pollux	E.	23 2 51	3913	21 36 57	3936	20 11 30	3965	18 46 38	3306
	Saturn	E.	48 25 32	2980	46 54 54	2973	45 24 8	2967	43 53 14	2960
	Regulus	E.	58 4 15	3010	56 34 15	3004	55 4 7	2997	53 33 51	2991
15	α Arietis	W.	66 43 40	3128	68 11 16	3116	69 39 6	3105	71 7 9	3095
	Aldebaran	W.	34 18 44	2954	35 49 54	2947	37 21 13	2939	38 52 42	2931
	Saturn	E.	36 16 35	2926	34 44 49	2919	33 12 54	2912	31 40 50	2905
	Regulus	E.	46 0 29	2958	44 29 23	2951	42 58 9	2944	41 26 46	2937
	Spica	E.	99 57 20	2985	98 26 48	2977	96 56 6	2969	95 25 15	2962
16	α Arietis	W.	78 30 36	3044	79 59 54	3034	81 29 24	3026	82 59 5	3017
	Aldebaran	W.	46 32 40	2891	48 5 11	2883	49 37 52	2874	51 10 44	2866
	Saturn	E.	23 58 11	2868	22 25 11	2862	20 52 3	2855	19 18 46	2848
	Regulus	E.	33 47 40	2903	32 15 25	2897	30 43 2	2891	29 10 31	2884
	Spica	E.	87 48 32	2923	86 16 42	2915	84 44 42	2906	83 12 31	2898
17	α Arietis	W.	90 30 15	2973	92 1 1	2965	93 31 57	2958	95 3 2	2951
	Aldebaran	W.	58 57 41	2825	60 31 37	2817	62 5 43	2808	63 40 0	2800
	Regulus	E.	21 26 9	2861	19 53 0	2860	18 19 50	2860	16 46 40	2863
	Spica	E.	75 29 9	2860	73 55 59	2852	72 22 39	2845	70 49 10	2838
18	Aldebaran	W.	71 34 9	2759	73 9 31	2750	74 45 4	2742	76 20 48	2733
	Pollux	W.	27 58 40	2883	29 31 20	2864	31 4 25	2845	32 37 54	2826
	Spica	E.	62 59 21	2801	61 24 55	2795	59 50 20	2788	58 15 37	2782
	Antares	E.	108 53 16	2806	107 18 54	2796	105 44 21	2787	104 9 36	2778
19	Aldebaran	W.	84 22 16	2692	85 59 6	2684	87 36 8	2675	89 13 21	2667
	Pollux	W.	40 30 26	2756	42 5 51	2744	43 41 32	2732	45 17 29	2721
	Spica	E.	50 19 55	2752	48 44 24	2747	47 8 46	2741	45 33 1	2737
	Antares	E.	96 12 55	2734	94 37 0	2725	93 0 54	2717	91 24 37	2709

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
20	Aldebaran	W.	90° 50′ 45″	2658	92° 28′ 21″	2650	94° 6′ 8″	2642	95° 44′ 6″	2633
	Pollux	W.	46 53 41	2710	48 30 8	2698	50 6 50	2687	51 43 47	2677
	SATURN	W.	20 41 27	2639	22 19 29	2630	23 57 43	2621	25 36 10	2612
	Spica	E.	43 57 10	2733	42 21 14	2729	40 45 13	2727	39 9 9	2725
	Antares	E.	89 48 9	2701	88 11 30	2692	86 34 39	2684	84 57 37	2676
	JUPITER	E.	107 56 48	2729	106 20 46	2719	104 44 32	2711	103 8 7	2702
21	Pollux	W.	59 51 59	2626	61 30 18	2616	63 8 51	2607	64 47 37	2597
	SATURN	W.	33 51 29	2567	35 31 9	2558	37 11 2	2549	38 51 7	2540
	Regulus	W.	23 53 12	2617	25 31 44	2605	27 10 33	2593	28 49 38	2582
	Spica	E.	31 8 33	2732	29 32 35	2738	27 56 45	2747	26 21 8	2760
	Antares	E.	76 49 44	2635	75 11 36	2627	73 33 18	2619	71 54 49	2611
	JUPITER	E.	95 3 5	2658	93 25 29	2650	91 47 42	2640	90 9 42	2632
	SUN	E.	129 42 57	2935	128 11 22	2926	126 39 36	2916	125 7 38	2906
22	Pollux	W.	73 4 46	2549	74 44 51	2540	76 25 9	2530	78 5 41	2520
	SATURN	W.	47 14 41	2494	48 56 2	2485	50 37 36	2477	52 19 22	2467
	Regulus	W.	37 8 40	2531	38 49 10	2520	40 29 55	2510	42 10 54	2501
	Antares	E.	63 39 46	2574	62 0 15	2566	60 20 33	2559	58 40 41	2552
	JUPITER	E.	81 56 39	2586	80 17 25	2577	78 37 59	2568	76 58 20	2559
	SUN	E.	117 24 42	2859	115 51 30	2848	114 18 5	2838	112 44 27	2829
23	Pollux	W.	86 31 39	2473	88 13 30	2463	89 55 35	2454	91 37 53	2445
	SATURN	W.	60 51 28	2421	62 34 33	2411	64 17 52	2402	66 1 24	2393
	Regulus	W.	50 39 11	2452	52 21 32	2442	54 4 7	2432	55 46 56	2423
	Antares	E.	50 19 5	2520	48 38 20	2515	46 57 28	2511	45 16 30	2507
	JUPITER	E.	68 36 50	2512	66 55 53	2502	65 14 42	2492	63 33 18	2483
	SUN	E.	104 53 7	2779	103 18 12	2769	101 43 3	2759	100 7 41	2748
24	SATURN	W.	74 42 26	2346	76 27 19	2336	78 12 26	2327	79 57 46	2317
	Regulus	W.	64 24 25	2375	66 8 36	2365	67 53 1	2355	69 37 40	2346
	Antares	E.	36 50 32	2498	35 9 16	2501	33 28 4	2505	31 46 58	2512
	JUPITER	E.	55 2 58	2436	53 20 14	2426	51 37 16	2417	49 54 5	2407
	SUN	E.	92 7 29	2698	90 30 46	2688	88 53 50	2678	87 16 40	2668
25	SATURN	W.	88 47 51	2272	90 34 32	2263	92 21 26	2254	94 8 33	2245
	Regulus	W.	78 24 17	2300	80 10 17	2291	81 56 30	2282	83 42 56	2274
	Spica	W.	25 18 46	2484	27 0 22	2454	28 42 40	2428	30 25 35	2404
	JUPITER	E.	41 14 50	2362	39 30 20	2353	37 45 38	2344	36 0 43	2336
	SUN	E.	79 7 31	2618	77 29 1	2610	75 50 19	2600	74 11 24	2591
26	Regulus	W.	92 38 9	2233	94 25 47	2226	96 13 36	2218	98 1 36	2212
	Spica	W.	39 7 39	2315	40 53 16	2302	42 39 13	2289	44 25 28	2278
	SUN	E.	65 53 43	2548	64 13 36	2540	62 33 18	2533	60 52 50	2525
27	Regulus	W.	107 4 0	2182	108 52 54	2177	110 41 56	2172	112 31 5	2169
	Spica	W.	53 20 38	2231	55 8 20	2224	56 56 12	2217	58 44 14	2210
	SUN	E.	52 28 3	2494	50 46 41	2488	49 5 11	2483	47 23 34	2479
28	Spica	W.	67 46 26	2189	69 35 10	2186	71 23 58	2184	73 12 49	2184
	Antares	W.	22 40 52	2441	24 23 29	2401	26 7 3	2368	27 51 24	2342
	SUN	E.	38 54 13	2465	37 12 10	2464	35 30 6	2463	33 48 1	2463

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ′ ″		° ′ ″		° ′ ″		° ′ ″	
20	Aldebaran	W.	97 22 16	2625	99 0 37	2616	100 39 10	2607	102 17 55	2599
	Pollux	W.	53 20 58	2666	54 58 23	2657	56 36 1	2646	58 13 53	2636
	SATURN	W.	27 14 49	2602	28 53 41	2593	30 32 45	2585	32 12 1	2576
	Spica	E.	37 33 2	2723	35 56 53	2723	34 20 44	2725	32 44 37	2727
	Antares	E.	83 20 25	2668	81 43 2	2659	80 5 27	2651	78 27 41	2643
	JUPITER	E.	101 31 30	2693	99 54 41	2685	98 17 41	2676	96 40 29	2667
21	Pollux	W.	66 26 36	2587	68 5 49	2577	69 45 15	2568	71 24 54	2559
	SATURN	W.	40 31 25	2531	42 11 55	2522	43 52 38	2513	45 33 33	2504
	Regulus	W.	30 28 58	2572	32 8 32	2561	33 48 21	2551	35 28 24	2541
	Spica	E.	24 45 48	2778	23 10 51	2802	21 36 26	2835	20 2 44	2879
	Antares	E.	70 16 9	2604	68 37 19	2596	66 58 18	2588	65 19 7	2581
	JUPITER	E.	88 31 30	2623	86 53 6	2613	85 14 29	2604	83 35 40	2596
	SUN	E.	123 35 27	2897	122 3 4	2887	120 30 29	2878	118 57 42	2868
22	Pollux	W.	79 46 26	2511	81 27 24	2501	83 8 36	2492	84 50 1	2482
	SATURN	W.	54 1 21	2458	55 43 33	2449	57 25 58	2440	59 8 36	2430
	Regulus	W.	43 52 6	2491	45 33 32	2482	47 15 11	2472	48 57 4	2462
	Antares	E.	57 0 40	2545	55 20 30	2538	53 40 10	2533	51 59 42	2526
	JUPITER	E.	75 18 28	2549	73 38 23	2540	71 58 5	2530	70 17 34	2521
	SUN	E.	111 10 37	2819	109 36 34	2809	108 2 18	2799	106 27 49	2789
23	Pollux	W.	93 20 24	2436	95 3 8	2426	96 46 6	2417	98 29 17	2408
	SATURN	W.	67 45 9	2383	69 29 8	2374	71 13 20	2364	72 57 46	2355
	Regulus	W.	57 29 58	2413	59 13 14	2403	60 56 44	2394	62 40 28	2384
	Antares	E.	43 35 26	2503	41 54 17	2500	40 13 4	2499	38 31 49	2497
	JUPITER	E.	61 51 41	2473	60 9 50	2464	58 27 46	2455	56 45 29	2445
	SUN	E.	98 32 5	2738	96 56 16	2729	95 20 14	2718	93 43 58	2708
24	SATURN	W.	81 43 20	2308	83 29 8	2299	85 15 9	2290	87 1 23	2281
	Regulus	W.	71 22 32	2337	73 7 38	2328	74 52 57	2318	76 38 30	2309
	Antares	E.	30 6 1	2522	28 25 18	2535	26 44 53	2553	25 4 54	2580
	JUPITER	E.	48 10 40	2398	46 27 2	2389	44 43 11	2380	42 59 7	2371
	SUN	E.	85 39 17	2658	84 1 41	2648	82 23 51	2638	80 45 48	2628
25	SATURN	W.	95 55 53	2237	97 43 25	2229	99 31 9	2221	101 19 5	2213
	Regulus	W.	85 29 34	2265	87 16 25	2257	89 3 28	2249	90 50 43	2241
	Spica	W.	32 9 4	2382	33 53 4	2364	35 37 31	2346	37 22 23	2330
	JUPITER	E.	34 15 36	2328	32 30 18	2320	30 44 48	2313	28 59 7	2306
	SUN	E.	72 32 16	2581	70 52 55	2572	69 13 22	2564	67 33 38	2556
26	Regulus	W.	99 49 46	2205	101 38 6	2199	103 26 35	2193	105 15 13	2187
	Spica	W.	46 12 0	2267	47 58 48	2257	49 45 51	2247	51 33 8	2239
	SUN	E.	59 12 11	2518	57 31 23	2511	55 50 25	2504	54 9 18	2499
27	Regulus	W.	114 20 20	2165	116 9 40	2162	117 59 5	2159	119 48 34	2157
	Spica	W.	60 32 26	2205	62 20 46	2200	64 9 13	2196	65 57 47	2192
	SUN	E.	45 41 51	2475	44 0 3	2472	42 18 10	2469	40 36 13	2467
28	Spica	W.	75 1 41	2182	76 50 35	2182	78 39 29	2183	80 28 22	2184
	Antares	W.	29 36 23	2321	31 21 52	2304	33 7 46	2290	34 54 0	2279
	SUN	E.	32 5 56	2464	30 23 52	2465	28 41 50	2467	26 59 51	2470

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Frid.	1	21 1 27.89	10.175	S. 16 57 4.4	+43.10	16 15.95	68.21	13 53.83	0.318
Sat.	2	21 5 31.67	10.141	16 39 41.0	43.83	16 15.80	68.10	14 1.04	0.284
SUN.	3	21 9 34.62	10.105	16 22 0.3	44.55	16 15.65	67.98	14 7.42	0.249
Mon.	4	21 13 36.74	10.070	16 4 2.5	+45.25	16 15.49	67.87	14 12.96	0.214
Tues.	5	21 17 38.03	10.036	15 45 48.2	45.93	16 15.33	67.75	14 17.68	0.180
Wed.	6	21 21 38.49	10.002	15 27 17.8	46.59	16 15.17	67.64	14 21.57	0.146
Thur.	7	21 25 38.13	9.968	15 8 31.7	+47.24	16 15.00	67.52	14 24.64	0.112
Frid.	8	21 29 36.94	9.934	14 49 30.4	47.86	16 14.83	67.41	14 26.89	0.078
Sat.	9	21 33 34.94	9.900	14 30 14.2	48.48	16 14.65	67.30	14 28.34	0.044
SUN.	10	21 37 32.13	9.867	14 10 43.6	+49.07	16 14.47	67.19	14 28.98	0.011
Mon.	11	21 41 28.53	9.834	13 50 59.0	49.64	16 14.28	67.08	14 28.83	0.022
Tues.	12	21 45 24.15	9.802	13 31 0.9	50.20	16 14.09	66.97	14 27.89	0.054
Wed.	13	21 49 19.01	9.771	13 10 49.6	+50.75	16 13.90	66.87	14 26.19	0.085
Thur.	14	21 53 13.11	9.739	12 50 25.5	51.26	16 13.70	66.76	14 23.75	0.116
Frid.	15	21 57 6.47	9.709	12 29 49.0	51.76	16 13.50	66.66	14 20.57	0.146
Sat.	16	22 0 59.10	9.679	12 9 0.6	+52.25	16 13.29	66.55	14 16 66	0.176
SUN.	17	22 4 51.04	9.650	11 48 0.6	52.73	16 13.08	66.45	14 12.05	0.205
Mon.	18	22 8 42.29	9.622	11 26 49.5	53.19	16 12.86	66.35	14 6.76	0.233
Tues.	19	22 12 32.87	9.594	11 5 27.6	+53.63	16 12.64	66.25	14 0.81	0.261
Wed.	20	22 16 22.80	9.567	10 43 55.3	54.05	16 12.42	66.15	13 54.20	0.288
Thur.	21	22 20 12.09	9.541	10 22 13.0	54.46	16 12.19	66.06	13 46.95	0.314
Frid.	22	22 24 0.76	9.516	10 0 21.1	+54.85	16 11.96	65.97	13 39.09	0.339
Sat.	23	22 27 48.82	9.491	9 38 20.0	55.23	16 11.72	65.88	13 30.62	0.364
SUN.	24	22 31 36.29	9.467	9 16 10.1	55.58	16 11.48	65.79	13 21.57	0.388
Mon.	25	22 35 23.19	9.443	8 53 51.9	+55.92	16 11.24	65.71	13 11.94	0.412
Tues.	26	22 39 9.54	9.420	8 31 25.7	56.25	16 11.00	65.63	13 1.77	0.435
Wed.	27	22 42 55.35	9.398	8 8 51.9	56 56	16 10.76	65.55	12 51.06	0.457
Thur.	28	22 46 40.63	9.376	7 46 10.9	56.85	16 10.52	65.47	12 39.82	0.479
Frid.	29	22 50 25.39	9.355	S. 7 23 23.2	+57.12	16 10.27	65.40	12 28.05	0.500

NOTE.—The mean time of semidiameter passing may be found by subtracting $0^s.18$ from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
Frid.	1	21 1 25.54	10.174	S. 16 57 14.5	+43.09	13 53.76	0.318	20 47 31.78
Sat.	2	21 5 29.31	10.140	16 39 51.4	43.82	14 0.97	0.284	20 51 28.34
SUN.	3	21 9 32.25	10.105	16 22 10.9	44.54	14 7.36	0.249	20 55 24.89
Mon.	4	21 13 34.36	10.070	16 4 13.3	+45.24	14 12.91	0.214	20 59 21.45
Tues.	5	21 17 35.64	10.036	15 45 59.2	45.92	14 17.64	0.180	21 3 18.00
Wed.	6	21 21 36.10	10.002	15 27 29.0	46.58	14 21.54	0.146	21 7 14.56
Thur.	7	21 25 35.74	9.968	15 8 43.1	+47.23	14 24.62	0.112	21 11 11.12
Frid.	8	21 29 34.55	9.934	14 49 42.0	47.86	14 26 88	0.078	21 15 7.67
Sat.	9	21 33 32.55	9.900	14 30 26.0	48.47	14 28.33	0.044	21 19 4.22
SUN.	10	21 37 29.75	9.867	14 10 55.5	+49.06	14 28.98	0.011	21 23 0.77
Mon.	11	21 41 26.16	9.834	13 51 11.1	49.63	14 28.83	0.022	21 26 57.33
Tues.	12	21 45 21.79	9.802	13 31 13.1	50.19	14 27.90	0.054	21 30 53.89
Wed.	13	21 49 16.66	9.771	13 11 1.8	+50.74	14 26.21	0.085	21 34 50.45
Thur.	14	21 53 10.78	9.740	12 50 37.8	51.26	14 23.78	0.116	21 38 47.00
Frid.	15	21 57 4.15	9.710	12 30 1.4	51.76	14 20.60	0.146	21 42 43.55
Sat.	16	22 0 56.80	9.680	12 9 13.1	+52.25	14 16.70	0.176	21 46 40.10
SUN.	17	22 4 48.76	9.651	11 48 13.2	52.73	14 12.10	0.205	21 50 36.66
Mon.	18	22 8 40.03	9.623	11 27 2.0	53.19	14 6.82	0.233	21 54 33.21
Tues.	19	22 12 30.63	9.595	11 5 40.1	+53.63	14 0.87	0.261	21 58 29.76
Wed.	20	22 16 20.58	9.568	10 44 7.8	54.05	13 54.26	0.288	22 2 26.32
Thur.	21	22 20 9.89	9.542	10 22 25.5	54.46	13 47.02	0.314	22 6 22.87
Frid.	22	22 23 58.59	9.517	10 0 33.5	+54.85	13 39.16	0.339	22 10 19.43
Sat.	23	22 27 46.68	9.492	9 38 32.4	55.23	13 30.70	0.364	22 14 15.98
SUN.	24	22 31 34.18	9.468	9 16 22.5	55.58	13 21.65	0.388	22 18 12.53
Mon.	25	22 35 21.11	9.444	8 54 4.2	+55.92	13 12.03	0.412	22 22 9.08
Tues.	26	22 39 7.49	9.421	8 31 37.9	56.25	13 1.86	0.435	22 26 5.63
Wed.	27	22 42 53.34	9.399	8 9 4.0	56.56	12 51.15	0.457	22 30 2.19
Thur.	28	22 46 38.65	9.377	7 46 22.9	56.85	12 39.91	0.479	22 33 58.74
Frid.	29	22 50 23.44	9.356	S. 7 23 35.2	+57.13	12 28.15	0.500	22 37 55.29

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

Diff. for 1 hour,
$+9^{s}.8565$.
(Table III.)

AT GREENWICH MEAN NOON.									
		THE SUN'S							
		TRUE LONGITUDE.							
Day of the Month.	Day of the Year.	λ	λ′	Diff. for 1 Hour.	LATITUDE.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		° ′ ″	′ ″	″	″			h m s
1	32	312 53 38.0	53 48.6	152.21	− 0.29	9.9937475	+27.9	3 11 56.69
2	33	313 54 30.4	54 40.9	152.16	0.40	9.9938151	28.4	3 8 0.78
3	34	314 55 21.6	55 32.0	152.10	0.48	9.9938839	29.0	3 4 4.87
4	35	315 56 11.5	56 21.7	152.04	− 0.53	9.9939541	+29.6	3 0 8.96
5	36	316 56 59.9	57 10.0	151.98	0.56	9.9940258	30.2	2 56 13.05
6	37	317 57 46.7	57 56.7	151.92	0.55	9.9940990	30.8	2 52 17.15
7	38	318 58 31.9	58 41.8	151.85	− 0.51	9.9941738	+31.5	2 48 21.24
8	39	319 59 15.6	59 25.4	151.79	0.45	9.9942502	32.2	2 44 25.33
9	40	320 59 57.7	60 7.4	151.72	0.36	9.9943283	32.9	2 40 29.42
10	41	322 0 38.1	0 47.6	151.65	− 0.26	9.9944083	+33.7	2 36 33.51
11	42	323 1 16.8	1 26.2	151.58	0.14	9.9944904	34.6	2 32 37.60
12	43	324 1 53.9	2 3.2	151.51	− 0.01	9.9945746	35.5	2 28 41.69
13	44	325 2 29.4	2 38.6	151.44	+ 0.13	9.9946610	+36.4	2 24 45.78
14	45	326 3 3.2	3 12.3	151.37	0.25	9.9947495	37.2	2 20 49.87
15	46	327 3 35.4	3 44.4	151.31	0.36	9.9948400	38.1	2 16 53.96
16	47	328 4 6.1	4 15.0	151.25	+ 0.46	9.9949325	+39.0	2 12 58.05
17	48	329 4 35.4	4 44.2	151.19	0.54	9.9950272	39.9	2 9 2.14
18	49	330 5 3.3	5 12.0	151.13	0.58	9.9951240	40.7	2 5 6.23
19	50	331 5 29.7	5 38.3	151.07	+ 0.59	9.9952227	+41.5	2 1 10.32
20	51	332 5 54.7	6 3.1	151.01	0.57	9.9953232	42.2	1 57 14.41
21	52	333 6 18.3	6 26.6	150.95	0.52	9.9954254	42.9	1 53 18.51
22	53	334 6 40.4	6 48.6	150.89	+ 0.45	9.9955292	+43.5	1 49 22.60
23	54	335 7 1.2	7 9.3	150.83	0.35	9.9956343	44.0	1 45 26.69
24	55	336 7 20.6	7 28.6	150.77	0.23	9.9957405	44.5	1 41 30.78
25	56	337 7 38.5	7 46.4	150.71	+ 0.10	9.9958478	+44.9	1 37 34.88
26	57	338 7 54.9	8 2.7	150.65	− 0.03	9.9959559	45.2	1 33 38.98
27	58	339 8 9.7	8 17.4	150.58	0.16	9.9960648	45.5	1 29 43.07
28	59	340 8 22.9	8 30.5	150.51	0.28	9.9961744	45.8	1 25 47.17
29	60	341 8 34.4	8 41.9	150.44	− 0.39	9.9962844	+46.0	1 21 51.26

NOTE.—The numbers in column λ correspond to the true equinox of the date; in column λ′, to the mean equinox of January 0ᵈ.0.

Diff. for 1 Hour,
— 9ˢ.8296.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	16 1.0	15 54.9	58 40.2	−1.81	58 17.7	−1.93	1 18.7	2.22	1.1
2	15 48.4	15 41.8	57 54.0	2.01	57 29.6	2.04	2 10.3	2.08	2.1
3	15 35.1	15 28.5	57 5.0	2.04	56 40.7	1.99	2 58.4	1.94	3.1
4	15 22.1	15 16.0	56 17.2	−1.91	55 55.0	−1.79	3 44.0	1.86	4.1
5	15 10.4	15 5.3	55 34.3	1.65	55 15.5	1.48	4 27.9	1.81	5.1
6	15 0.7	14 56.8	54 58.8	1.29	54 44.5	1.09	5 11.2	1.80	6.1
7	14 53.6	14 51.1	54 32.7	−0.88	54 23.4	−0.66	5 54.6	1.82	7.1
8	14 49.3	14 48.2	54 16.8	0.44	54 12.8	−0.23	6 38.9	1.88	8.1
9	14 47.8	14 48.1	54 11.4	−0.01	54 12.5	+0.20	7 24.7	1.94	9.1
10	14 49.1	14 50.7	54 16.1	+0.40	54 22.0	+0.58	8 12.2	2.01	10.1
11	14 52.9	14 55.6	54 30.0	0.75	54 40.0	0.90	9 1.2	2.07	11.1
12	14 58.8	15 2.4	54 51.7	1.04	55 4.9	1.16	9 51.5	2.11	12.1
13	15 6.3	15 10.5	55 19.4	+1.25	55 34.8	+1.31	10 42.3	2.12	13.1
14	15 14.9	15 19.4	55 50.9	1.36	56 7.5	1.39	11 32.9	2.10	14.1
15	15 24.0	15 28.6	56 24.3	1.40	56 41.0	1.38	12 22.9	2.06	15.1
16	15 33.0	15 37.3	56 57.3	+1.34	57 13.1	+1.29	13 12.1	2.03	16.1
17	15 41.4	15 45.4	57 28.3	1.23	57 42.7	1.16	14 0.6	2.01	17.1
18	15 49.0	15 52.4	57 56.1	1.08	58 8.5	1.00	14 48.9	2.02	18.1
19	15 55.5	15 58.3	58 20.0	+0.91	58 30.4	+0.83	15 37.8	2.06	19.1
20	16 0.9	16 3.2	58 39.8	0.74	58 48.2	0.66	16 28.0	2.13	20.1
21	16 5.2	16 7.0	58 55.6	0.58	59 2.1	0.50	17 20.4	2.22	21.1
22	16 8.4	16 9.6	59 7.5	+0.41	59 11.9	+0.32	18 15.4	2.35	22.1
23	16 10.6	16 11.2	59 15.3	0.23	59 17.5	+0.13	19 12.9	2.44	23.1
24	16 11.4	16 11.3	59 18.5	+0.02	59 18.0	−0.10	20 12.1	2.48	24.1
25	16 10.8	16 9.8	59 16.1	−0.23	59 12.5	−0.37	21 11.7	2.46	25.1
26	16 8.4	16 6.4	59 7.2	0.52	59 0.0	0.68	22 10.0	2.38	26.1
27	16 3.9	16 1.0	58 50.9	0.83	58 40.0	0.99	23 5.7	2.25	27.1
28	15 57.5	15 53.5	58 27.2	1.14	58 12.6	1.28	23 58.2	2.12	28.1
29	15 49.1	15 44.4	57 56.5	−1.40	57 39.1	−1.50	δ		29.1

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	FRIDAY 1.					**SUNDAY 3.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	22 3 24.13	2.3183	S. 15 15 31.5	9.714	0	23 48 9.82	2.0617	S. 6 24 20.4	11.909
1	22 5 43.05	2.3123	15 5 46.3	9.792	1	23 50 13.39	2.0575	6 12 25.4	11.925
2	22 8 1.61	2.3063	14 55 56.5	9.868	2	23 52 16.72	2.0534	6 0 29.4	11.940
3	22 10 19.81	2.3002	14 46 2.1	9.944	3	23 54 19.80	2.0493	5 48 32.6	11.952
4	22 12 37.64	2.2942	14 36 3.2	10.018	4	23 56 22.63	2.0452	5 36 35.1	11.964
5	22 14 55.11	2.2882	14 25 59.9	10.091	5	23 58 25.22	2.0413	5 24 36.9	11.976
6	22 17 12.22	2.2822	14 15 52.3	10.162	6	0 0 27.58	2.0374	5 12 38.0	11.986
7	22 19 28.97	2.2762	14 5 40.5	10.231	7	0 2 29.71	2.0336	5 0 38.6	11.994
8	22 21 45.37	2.2703	13 55 24.6	10.299	8	0 4 31.61	2.0297	4 48 38.7	12.002
9	22 24 1.41	2.2643	13 45 4.6	10.366	9	0 6 33.28	2.0259	4 36 38.3	12.010
10	22 26 17.09	2.2584	13 34 40.7	10.431	10	0 8 34.72	2.0222	4 24 37.5	12.016
11	22 28 32.42	2.2525	13 24 12.9	10.494	11	0 10 35.94	2.0186	4 12 36.4	12.020
12	22 30 47.39	2.2466	13 13 41.4	10.556	12	0 12 36.95	2.0151	4 0 35.1	12.023
13	22 33 2.01	2.2408	13 3 6.2	10.617	13	0 14 37.75	2.0116	3 48 33.6	12.027
14	22 35 16.29	2.2351	12 52 27.4	10.677	14	0 16 38.34	2.0082	3 36 31.9	12.030
15	22 37 30.22	2.2293	12 41 45.0	10.735	15	0 18 38.73	2.0048	3 24 30.0	12.032
16	22 39 43.80	2.2235	12 30 59.2	10.792	16	0 20 38.92	2.0015	3 12 28.1	12.031
17	22 41 57.04	2.2177	12 20 10.0	10.847	17	0 22 38.91	1.9982	3 0 26.3	12.030
18	22 44 9.93	2.2120	12 9 17.6	10.900	18	0 24 38.70	1.9949	2 48 24.5	12.029
19	22 46 22.48	2.2063	11 58 22.0	10.952	19	0 26 38.30	1.9918	2 36 22.8	12.027
20	22 48 34.69	2.2007	11 47 23.3	11.003	20	0 28 37.72	1.9888	2 24 21.3	12.023
21	22 50 46.57	2.1952	11 36 21.6	11.053	21	0 30 36.96	1.9858	2 12 20.1	12.018
22	22 52 58.12	2.1897	11 25 16.9	11.102	22	0 32 36.02	1.9828	2 0 19.1	12.013
23	22 55 9.34	2.1842	S. 11 14 9.4	11.148	23	0 34 34.90	1.9799	S. 1 48 18.5	12.007
	SATURDAY 2.					**MONDAY 4.**			
0	22 57 20.23	2.1787	S. 11 2 59.1	11.194	0	0 36 33.61	1.9771	S. 1 36 18.3	12.000
1	22 59 30.79	2.1733	10 51 46.1	11.238	1	0 38 32.15	1.9743	1 24 18.5	11.992
2	23 1 41.03	2.1679	10 40 30.5	11.282	2	0 40 30.53	1.9717	1 12 19.2	11.983
3	23 3 50.94	2.1625	10 29 12.3	11.323	3	0 42 28.75	1.9691	1 0 20.5	11.973
4	23 6 0.53	2.1572	10 17 51.7	11.362	4	0 44 26.82	1.9665	0 48 22.4	11.964
5	23 8 9.81	2.1520	10 6 28.8	11.401	5	0 46 24.73	1.9639	0 36 24.8	11.954
6	23 10 18.77	2.1468	9 55 3.6	11.439	6	0 48 22.49	1.9615	0 24 27.9	11.942
7	23 12 27.42	2.1416	9 43 36.1	11.476	7	0 50 20.11	1.9592	0 12 31.8	11.929
8	23 14 35.76	2.1365	9 32 6.5	11.511	8	0 52 17.59	1.9568	S. 0 0 36.4	11.916
9	23 16 43.80	2.1315	9 20 34.8	11.545	9	0 54 14.93	1.9545	N. 0 11 18.1	11.901
10	23 18 51.54	2.1265	9 9 1.1	11.577	10	0 56 12.13	1.9522	0 23 11.7	11.886
11	23 20 58.98	2.1215	8 57 25.5	11.608	11	0 58 9.20	1.9501	0 35 4.4	11.871
12	23 23 6.12	2.1166	8 45 48.1	11.638	12	1 0 6.14	1.9480	0 46 56.2	11.855
13	23 25 12.97	2.1117	8 34 8.9	11.668	13	1 2 2.96	1.9460	0 58 47.0	11.838
14	23 27 19.53	2.1069	8 22 28.0	11.696	14	1 3 59.66	1.9441	1 10 36.7	11.819
15	23 29 25.80	2.1022	8 10 45.4	11.723	15	1 5 56.25	1.9422	1 22 25.3	11.800
16	23 31 31.79	2.0974	7 59 1.3	11.748	16	1 7 52.72	1.9403	1 34 12.7	11.780
17	23 33 37.49	2.0927	7 47 15.7	11.773	17	1 9 49.08	1.9385	1 45 58.9	11.760
18	23 35 42.91	2.0881	7 35 28.6	11.796	18	1 11 45.34	1.9368	1 57 43.9	11.739
19	23 37 48.06	2.0836	7 23 40.2	11.817	19	1 13 41.50	1.9352	2 9 27.6	11.718
20	23 39 52.94	2.0791	7 11 50.5	11.838	20	1 15 37.56	1.9335	2 21 10.0	11.696
21	23 41 57.55	2.0747	6 59 59.6	11.857	21	1 17 33.52	1.9319	2 32 51.1	11.672
22	23 44 1.90	2.0703	6 48 7.6	11.876	22	1 19 29.39	1.9305	2 44 30.7	11.648
23	23 46 5.99	2.0660	6 36 14.5	11.893	23	1 21 25.18	1.9291	2 56 8.9	11.624
24	23 48 9.82	2.0617	S. 6 24 20.4	11.909	24	1 23 20.88	1.9277	N. 3 7 45.6	11.599

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

TUESDAY 5.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	1 23 20.88	1.9277	N. 3 7 45.6	11.599
1	1 25 16.50	1.9264	3 19 20.8	11.573
2	1 27 12.05	1.9252	3 30 54.4	11.546
3	1 29 7.52	1.9239	3 42 26.4	11.519
4	1 31 2.92	1.9228	3 53 56.7	11.492
5	1 32 58.26	1.9218	4 5 25.4	11.464
6	1 34 53.54	1.9208	4 16 52.4	11.435
7	1 36 48.76	1.9198	4 28 17.6	11.405
8	1 38 43.92	1.9189	4 39 41.0	11.374
9	1 40 39.03	1.9181	4 51 2.5	11.343
10	1 42 34.09	1.9173	5 2 22.1	11.311
11	1 44 29.11	1.9166	5 13 39.8	11.279
12	1 46 24.08	1.9159	5 24 55.6	11.246
13	1 48 19.01	1.9152	5 36 9.4	11.212
14	1 50 13.91	1.9147	5 47 21.1	11.178
15	1 52 8.78	1.9142	5 58 30.8	11.144
16	1 54 3.62	1.9138	6 9 38.4	11.108
17	1 55 58.44	1.9135	6 20 43.8	11.072
18	1 57 53.24	1.9131	6 31 47.1	11.036
19	1 59 48.02	1.9128	6 42 48.2	10.999
20	2 1 42.78	1.9126	6 53 47.0	10.961
21	2 3 37.53	1.9124	7 4 43.5	10.922
22	2 5 32.27	1.9123	7 15 37.7	10.883
23	2 7 27.01	1.9122	N. 7 26 29.5	10.843

WEDNESDAY 6.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	2 9 21.74	1.9122	N. 7 37 18.9	10.803
1	2 11 16.48	1.9123	7 48 5.9	10.763
2	2 13 11.22	1.9124	7 58 50.5	10.722
3	2 15 5.97	1.9126	8 9 32.6	10.681
4	2 17 0.73	1.9128	8 20 12.2	10.638
5	2 18 55.50	1.9130	8 30 49.2	10.595
6	2 20 50.29	1.9133	8 41 23.6	10.552
7	2 22 45.10	1.9137	8 51 55.4	10.507
8	2 24 39.93	1.9141	9 2 24.5	10.462
9	2 26 34.79	1.9146	9 12 50.9	10.417
10	2 28 29.68	1.9151	9 23 14.6	10.372
11	2 30 24.60	1.9156	9 33 35.6	10.326
12	2 32 19.55	1.9162	9 43 53.8	10.279
13	2 34 14.54	1.9169	9 54 9.1	10.232
14	2 36 9.58	1.9176	10 4 21.6	10.184
15	2 38 4.66	1.9183	10 14 31.2	10.135
16	2 39 59.78	1.9191	10 24 37.8	10.086
17	2 41 54.95	1.9200	10 34 41.5	10.037
18	2 43 50.18	1.9209	10 44 42.2	9.987
19	2 45 45.46	1.9218	10 54 39.9	9.936
20	2 47 40.80	1.9228	11 4 34.5	9.884
21	2 49 36.20	1.9238	11 14 26.0	9.832
22	2 51 31.66	1.9249	11 24 14.4	9.780
23	2 53 27.19	1.9261	11 33 59.6	9.727
24	2 55 22.79	1.9273	N.11 43 41.6	9.673

THURSDAY 7.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	2 55 22.79	1.9273	N.11 43 41.6	9.673
1	2 57 18.46	1.9285	11 53 20.4	9.619
2	2 59 14.21	1.9297	12 2 55.9	9.565
3	3 1 10.03	1.9310	12 12 28.2	9.511
4	3 3 5.93	1.9323	12 21 57.2	9.455
5	3 5 1.91	1.9337	12 31 22.8	9.398
6	3 6 57.97	1.9351	12 40 45.0	9.342
7	3 8 54.12	1.9366	12 50 3.8	9.285
8	3 10 50.36	1.9381	12 59 19.2	9.227
9	3 12 46.69	1.9397	13 8 31.1	9.169
10	3 14 43.12	1.9412	13 17 39.5	9.110
11	3 16 39.64	1.9428	13 26 44.3	9.050
12	3 18 36.26	1.9445	13 35 45.5	8.990
13	3 20 32.98	1.9462	13 44 43.1	8.930
14	3 22 29.80	1.9479	13 53 37.1	8.869
15	3 24 26.73	1.9497	14 2 27.4	8.808
16	3 26 23.76	1.9515	14 11 14.0	8.746
17	3 28 20.91	1.9534	14 19 56.9	8.683
18	3 30 18.17	1.9553	14 28 36.0	8.620
19	3 32 15.54	1.9572	14 37 11.3	8.556
20	3 34 13.03	1.9592	14 45 42.7	8.492
21	3 36 10.64	1.9611	14 54 10.3	8.427
22	3 38 8.36	1.9631	15 2 34.0	8.362
23	3 40 6.21	1.9652	N.15 10 53.8	8.297

FRIDAY 8.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	3 42 4.18	1.9672	N.15 19 9.6	8.230
1	3 44 2.28	1.9693	15 27 21.4	8.163
2	3 46 0.50	1.9714	15 35 29.2	8.096
3	3 47 58.85	1.9736	15 43 32.9	8.028
4	3 49 57.33	1.9758	15 51 32.5	7.959
5	3 51 55.95	1.9781	15 59 28.0	7.890
6	3 53 54.70	1.9803	16 7 19.3	7.820
7	3 55 53.59	1.9826	16 15 6.4	7.750
8	3 57 52.61	1.9849	16 22 49.3	7.680
9	3 59 51.77	1.9872	16 30 28.0	7.609
10	4 1 51.07	1.9895	16 38 2.4	7.537
11	4 3 50.51	1.9918	16 45 32.4	7.464
12	4 5 50.09	1.9942	16 52 58.1	7.391
13	4 7 49.82	1 9967	17 0 19.4	7.318
14	4 9 49.70	1.9992	17 7 36.3	7.244
15	4 11 49.72	2.0016	17 14 48.7	7.169
16	4 13 49.89	2.0041	17 21 56.6	7.094
17	4 15 50.21	2.0066	17 29 0.0	7.019
18	4 17 50.68	2.0091	17 35 58.9	6.943
19	4 19 51.30	2.0116	17 42 53.2	6.866
20	4 21 52.07	2.0142	17 49 42.9	6.789
21	4 23 53.00	2.0167	17 56 27.9	6.712
22	4 25 54.08	2.0193	18 3 8.3	6.633
23	4 27 55.32	2.0219	18 9 43.9	6.554
24	4 29 56.71	2.0245	N.18 16 14.8	6.475

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SATURDAY 9.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	4 29 56.71	2.0245	N.18 16 14.8	6.475
1	4 31 58.26	2.0272	18 22 40.9	6.395
2	4 33 59.97	2.0298	18 29 2.2	6.315
3	4 36 1.84	2.0325	18 35 18.7	6.234
4	4 38 3.87	2.0351	18 41 30.3	6.152
5	4 40 6.05	2.0377	18 47 37.0	6.070
6	4 42 8.39	2.0404	18 53 38.7	5.988
7	4 44 10.89	2.0431	18 59 35.5	5.905
8	4 46 13.56	2.0458	19 5 27.3	5.821
9	4 48 16.39	2.0485	19 11 14.0	5.737
10	4 50 19.38	2.0512	19 16 55.7	5.652
11	4 52 22.53	2.0539	19 22 32.2	5.566
12	4 54 25.85	2.0566	19 28 3.6	5.481
13	4 56 29.33	2.0593	19 33 29.9	5.395
14	4 58 32.97	2.0620	19 38 51.0	5.308
15	5 0 36.77	2.0647	19 44 6.8	5.220
16	5 2 40.74	2.0675	19 49 17.4	5.132
17	5 4 44.87	2.0702	19 54 22.7	5.044
18	5 6 49.16	2.0729	19 59 22.7	4.955
19	5 8 53.61	2.0756	20 4 17.3	4.865
20	5 10 58.23	2.0783	20 9 6.5	4.776
21	5 13 3.01	2.0810	20 13 50.4	4.686
22	5 15 7.95	2.0837	20 18 28.8	4.594
23	5 17 13.05	2.0863	N.20 23 1.7	4.503

SUNDAY 10.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	5 19 18.31	2.0890	N.20 27 29.1	4.411
1	5 21 23.73	2.0917	20 31 51.0	4.318
2	5 23 29.31	2.0943	20 36 7.3	4.225
3	5 25 35.05	2.0970	20 40 18.0	4.132
4	5 27 40.95	2.0996	20 44 23.1	4.038
5	5 29 47.01	2.1022	20 48 22.5	3.944
6	5 31 53.22	2.1048	20 52 16.3	3.849
7	5 33 59.59	2.1075	20 56 4.4	3.753
8	5 36 6.12	2.1101	20 59 46.7	3.657
9	5 38 12.80	2.1126	21 3 23.2	3.560
10	5 40 19.63	2.1152	21 6 53.9	3.463
11	5 42 26.62	2.1177	21 10 18.8	3.366
12	5 44 33.76	2.1202	21 13 37.9	3.269
13	5 46 41.05	2.1227	21 16 51.1	3.171
14	5 48 48.49	2.1252	21 19 58.4	3.072
15	5 50 56.07	2.1276	21 22 59.7	2.972
16	5 53 3.80	2.1301	21 25 55.1	2.873
17	5 55 11.68	2.1325	21 28 44.5	2.773
18	5 57 19.70	2.1349	21 31 27.9	2.672
19	5 59 27.87	2.1373	21 34 5.2	2.572
20	6 1 36.18	2.1396	21 36 36.5	2.471
21	6 3 44.62	2.1418	21 39 1.7	2.369
22	6 5 53.20	2.1441	21 41 20.8	2.267
23	6 8 1.92	2.1464	21 43 33.7	2.164
24	6 10 10.77	2.1487	N.21 45 40.5	2.061

MONDAY 11.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	6 10 10.77	2.1487	N.21 45 40.5	2.061
1	6 12 19.76	2.1509	21 47 41.1	1.958
2	6 14 28.88	2.1530	21 49 35.5	1.855
3	6 16 38.12	2.1551	21 51 23.7	1.751
4	6 18 47.49	2.1572	21 53 5.6	1.646
5	6 20 56.99	2.1593	21 54 41.2	1.541
6	6 23 6.61	2.1613	21 56 10.5	1.436
7	6 25 16.35	2.1633	21 57 33.5	1.331
8	6 27 26.21	2.1653	21 58 50.2	1.225
9	6 29 36.19	2.1673	22 0 0.5	1.119
10	6 31 46.29	2.1692	22 1 4.5	1.013
11	6 33 56.50	2.1711	22 2 2.1	0.906
12	6 36 6.82	2.1729	22 2 53.2	0.799
13	6 38 17.25	2.1747	22 3 37.9	0.692
14	6 40 27.78	2.1764	22 4 16.2	0.584
15	6 42 38.42	2.1781	22 4 48.0	0.476
16	6 44 49.16	2.1798	22 5 13.3	0.367
17	6 47 0.00	2.1814	22 5 32.1	0.259
18	6 49 10.93	2.1830	22 5 44.4	0.151
19	6 51 21.96	2.1846	22 5 50.2	+ 0.042
20	6 53 33.08	2.1861	22 5 49.4	− 0.068
21	6 55 44.29	2.1876	22 5 42.1	0.177
22	6 57 55.59	2.1890	22 5 28.2	0.287
23	7 0 6.97	2.1903	N.22 5 7.7	0.396

TUESDAY 12.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	7 2 18.43	2.1917	N.22 4 40.7	0.505
1	7 4 29.97	2.1930	22 4 7.1	0.616
2	7 6 41.59	2.1942	22 3 26.8	0.727
3	7 8 53.28	2.1954	22 2 39.9	0.837
4	7 11 5.04	2.1966	22 1 46.3	0.948
5	7 13 16.87	2.1977	22 0 46.1	1.058
6	7 15 28.77	2.1988	21 59 39.3	1.169
7	7 17 40.73	2.1998	21 58 25.8	1.281
8	7 19 52.75	2.2008	21 57 5.6	1.392
9	7 22 4.83	2.2017	21 55 38.8	1.503
10	7 24 16.96	2.2027	21 54 5.3	1.614
11	7 26 29.15	2.2036	21 52 25.1	1.726
12	7 28 41.39	2.2044	21 50 38.2	1.837
13	7 30 53.67	2.2051	21 48 44.6	1.949
14	7 33 6.00	2.2058	21 46 44.3	2.060
15	7 35 18.37	2.2065	21 44 37.4	2.171
16	7 37 30.78	2.2071	21 42 23.8	2.283
17	7 39 43.22	2.2076	21 40 3.4	2.396
18	7 41 55.69	2.2081	21 37 36.3	2.507
19	7 44 8.19	2.2086	21 35 2.5	2.619
20	7 46 20.72	2.2091	21 32 22.0	2.730
21	7 48 33.28	2.2095	21 29 34.9	2.841
22	7 50 45.86	2.2098	21 26 41.1	2.952
23	7 52 58.45	2.2100	21 23 40.6	3.064
24	7 55 11.06	2.2103	N.21 20 33.4	3.176

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

WEDNESDAY 13.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	7 55 11.06	2.2103	N.21 20 33.4	3.176
1	7 57 23.69	2.2106	21 17 19.5	3.287
2	7 59 36.33	2.2107	21 13 59.0	3.398
3	8 1 48.97	2.2108	21 10 31.8	3.509
4	8 4 1.62	2.2108	21 6 57.9	3.620
5	8 6 14.27	2.2109	21 3 17.4	3.730
6	8 8 26.93	2.2109	20 59 30.3	3.841
7	8 10 39.58	2.2108	20 55 36.5	3.952
8	8 12 52.23	2.2107	20 51 36.1	4.062
9	8 15 4.87	2.2106	20 47 29.1	4.172
10	8 17 17.50	2.2104	20 43 15.5	4.282
11	8 19 30.12	2.2102	20 38 55.3	4.391
12	8 21 42.73	2.2100	20 34 28.6	4.500
13	8 23 55.32	2.2097	20 29 55.3	4.609
14	8 26 7.89	2.2093	20 25 15.5	4.718
15	8 28 20.43	2.2088	20 20 29.1	4.827
16	8 30 32.95	2.2084	20 15 36.2	4.936
17	8 32 45.44	2.2079	20 10 36.8	5.044
18	8 34 57.90	2.2074	20 5 31.0	5.151
19	8 37 10.33	2.2069	20 0 18.7	5.258
20	8 39 22.73	2.2064	19 55 0.0	5.366
21	8 41 35.10	2.2058	19 49 34.8	5.473
22	8 43 47.43	2.2051	19 44 3.2	5.579
23	8 45 59.71	2.2043	N.19 38 25.3	5.685

THURSDAY 14.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	8 48 11.95	2.2036	N.19 32 41.0	5.791
1	8 50 24.14	2.2029	19 26 50.4	5.896
2	8 52 36.29	2.2022	19 20 53.5	6.001
3	8 54 48.40	2.2014	19 14 50.3	6.105
4	8 57 0.46	2.2005	19 8 40.9	6.209
5	8 59 12.46	2.1996	19 2 25.2	6.313
6	9 1 24.41	2.1987	18 56 3.3	6.417
7	9 3 36.30	2.1977	18 49 35.2	6.519
8	9 5 48.14	2.1968	18 43 1.0	6.621
9	9 7 59.92	2.1958	18 36 20.7	6.722
10	9 10 11.64	2.1947	18 29 34.3	6.823
11	9 12 23.29	2.1937	18 22 41.9	6.924
12	9 14 34.88	2.1927	18 15 43.4	7.025
13	9 16 46.41	2.1916	18 8 38.9	7.124
14	9 18 57.87	2.1904	18 1 28.5	7.223
15	9 21 9.26	2.1892	17 54 12.1	7.322
16	9 23 20.58	2.1881	17 46 49.8	7.420
17	9 25 31.83	2.1870	17 39 21.7	7.518
18	9 27 43.02	2.1858	17 31 47.7	7.615
19	9 29 54.13	2.1846	17 24 7.9	7.711
20	9 32 5.17	2.1833	17 16 22.4	7.807
21	9 34 16.13	2.1821	17 8 31.1	7.902
22	9 36 27.02	2.1808	17 0 34.1	7.996
23	9 38 37.83	2.1796	16 52 31.5	8.089
24	9 40 48.57	2.1783	N.16 44 23.4	8.182

FRIDAY 15.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	9 40 48.57	2.1783	N.16 44 23.4	8.182
1	9 42 59.23	2.1770	16 36 9.7	8.275
2	9 45 9.81	2.1757	16 27 50.4	8.367
3	9 47 20.31	2.1743	16 19 25.6	8.458
4	9 49 30.73	2.1730	16 10 55.4	8.548
5	9 51 41.07	2.1717	16 2 19.8	8.638
6	9 53 51.33	2.1703	15 53 38.8	8.727
7	9 56 1.51	2.1690	15 44 52.5	8.816
8	9 58 11.61	2.1676	15 36 0.9	8.904
9	10 0 21.62	2.1662	15 27 4.0	8.991
10	10 2 31.55	2.1648	15 18 2.0	9.076
11	10 4 41.40	2.1635	15 8 54.9	9.161
12	10 6 51.17	2.1621	14 59 42.7	9.246
13	10 9 0.86	2.1607	14 50 25.4	9.330
14	10 11 10.46	2.1593	14 41 3.1	9.413
15	10 13 19.98	2.1580	14 31 35.8	9.496
16	10 15 29.42	2.1566	14 22 3.6	9.577
17	10 17 38.77	2.1552	14 12 26.6	9.658
18	10 19 48.04	2.1538	14 2 44.7	9.738
19	10 21 57.23	2.1525	13 52 58.0	9.817
20	10 24 6.34	2.1512	13 43 6.7	9.894
21	10 26 15.37	2.1498	13 33 10.7	9.971
22	10 28 24.32	2.1485	13 23 10.1	10.048
23	10 30 33.19	2.1472	N.13 13 4.9	10.124

SATURDAY 16.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	10 32 41.98	2.1458	N.13 2 55.2	10.199
1	10 34 50.69	2.1445	12 52 41.0	10.273
2	10 36 59.32	2.1432	12 42 22.4	10.346
3	10 39 7.88	2.1420	12 31 59.5	10.418
4	10 41 16.36	2.1407	12 21 32.3	10.489
5	10 43 24.76	2.1394	12 11 0.8	10.560
6	10 45 33.09	2.1382	12 0 25.1	10.629
7	10 47 41.34	2.1369	11 49 45.3	10.698
8	10 49 49.52	2.1357	11 39 1.4	10.766
9	10 51 57.63	2.1346	11 28 13.4	10.833
10	10 54 5.67	2.1334	11 17 21.4	10.899
11	10 56 13.64	2.1322	11 6 25.5	10.963
12	10 58 21.54	2.1312	10 55 25.8	11.027
13	11 0 29.38	2.1301	10 44 22.3	11.090
14	11 2 37.15	2.1289	10 33 15.0	11.152
15	11 4 44.85	2.1278	10 22 4.0	11.213
16	11 6 52.49	2.1268	10 10 49.4	11.273
17	11 9 0.07	2.1258	9 59 31.2	11.333
18	11 11 7.59	2.1248	9 48 9.4	11.392
19	11 13 15.05	2.1239	9 36 44.1	11.449
20	11 15 22.46	2.1230	9 25 15.5	11.504
21	11 17 29.81	2.1221	9 13 43.6	11.559
22	11 19 37.11	2.1212	9 2 8.4	11.614
23	11 21 44.36	2.1203	8 50 29.9	11.667
24	11 23 51.55	2.1195	N. 8 38 48.3	11.719

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SUNDAY 17.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	11 23 51.55	2.1195	N. 8 38 48.3	11.719
1	11 25 58.70	2.1187	8 27 3.6	11.771
2	11 28 5.80	2.1179	8 15 15.8	11.822
3	11 30 12.85	2.1172	8 3 25.0	11.871
4	11 32 19.86	2.1166	7 51 31.3	11.918
5	11 34 26.84	2.1160	7 39 34.8	11.965
6	11 36 33.78	2.1153	7 27 35.5	12.012
7	11 38 40.68	2.1147	7 15 33.4	12.057
8	11 40 47.55	2.1142	7 3 28.7	12.100
9	11 42 54.38	2.1137	6 51 21.4	12.143
10	11 45 1.19	2.1132	6 39 11.5	12.186
11	11 47 7.97	2.1127	6 26 59.1	12.227
12	11 49 14.72	2.1123	6 14 44.3	12.267
13	11 51 21.45	2.1120	6 2 27.1	12.306
14	11 53 28.16	2.1117	5 50 7.6	12.343
15	11 55 34.85	2.1114	5 37 45.9	12.379
16	11 57 41.53	2.1112	5 25 22.1	12.414
17	11 59 48.20	2.1110	5 12 56.2	12.448
18	12 1 54.85	2.1108	5 0 28.3	12.482
19	12 4 1.50	2.1107	4 47 58.4	12.515
20	12 6 8.14	2.1107	4 35 26.5	12.546
21	12 8 14.78	2.1107	4 22 52.8	12.576
22	12 10 21.42	2.1107	4 10 17.4	12.605
23	12 12 28.06	2.1107	N. 3 57 40.2	12.633

MONDAY 18.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	12 14 34.70	2.1107	N. 3 45 1.4	12.660
1	12 16 41.35	2.1109	3 32 21.0	12.686
2	12 18 48.01	2.1112	3 19 39.1	12.710
3	12 20 54.69	2.1114	3 6 55.8	12.733
4	12 23 1.38	2.1117	2 54 11.1	12.756
5	12 25 8.09	2.1121	2 41 25.1	12.777
6	12 27 14.83	2.1125	2 28 37.9	12.797
7	12 29 21.59	2.1129	2 15 49.5	12.816
8	12 31 28.38	2.1133	2 3 0.0	12.834
9	12 33 35.19	2.1138	1 50 9.4	12.851
10	12 35 42.04	2.1145	1 37 17.9	12.866
11	12 37 48.93	2.1152	1 24 25.5	12.880
12	12 39 55.86	2.1159	1 11 32.3	12.893
13	12 42 2.83	2.1166	0 58 38.3	12.906
14	12 44 9.85	2.1173	0 45 43.6	12.917
15	12 46 16.91	2.1181	0 32 48.3	12.926
16	12 48 24.02	2.1190	0 19 52.5	12.934
17	12 50 31.19	2.1200	N. 0 6 56.2	12.942
18	12 52 38.42	2.1209	S. 0 6 0.6	12.949
19	12 54 45.70	2.1219	0 18 57.7	12.954
20	12 56 53.05	2.1231	0 31 55.1	12.958
21	12 59 0.47	2.1242	0 44 52.7	12.961
22	13 1 7.96	2.1254	0 57 50.4	12.962
23	13 3 15.52	2.1267	1 10 48.2	12.963
24	13 5 23.16	2.1280	S. 1 23 46.0	12.963

TUESDAY 19.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	13 5 23.16	2.1280	S. 1 23 46.0	12.963
1	13 7 30.88	2.1293	1 36 43.8	12.962
2	13 9 38.68	2.1307	1 49 41.4	12.958
3	13 11 46.56	2.1321	2 2 38.7	12.953
4	13 13 54.53	2.1337	2 15 35.7	12.948
5	13 16 2.60	2.1353	2 28 32.4	12.941
6	13 18 10.77	2.1369	2 41 28.6	12.933
7	13 20 19.03	2.1385	2 54 24.3	12.924
8	13 22 27.39	2.1402	3 7 19.5	12.914
9	13 24 35.85	2.1419	3 20 14.0	12.902
10	13 26 44.42	2.1438	3 33 7.8	12.890
11	13 28 53.11	2.1458	3 46 0.8	12.876
12	13 31 1.92	2.1477	3 58 52.9	12.861
13	13 33 10.84	2.1497	4 11 44.1	12.845
14	13 35 19.88	2.1517	4 24 34.3	12.827
15	13 37 29.04	2.1538	4 37 23.4	12.808
16	13 39 38.33	2.1559	4 50 11.3	12.788
17	13 41 47.75	2.1581	5 2 58.0	12.768
18	13 43 57.30	2.1604	5 15 43.4	12.746
19	13 46 6.99	2.1627	5 28 27.5	12.722
20	13 48 16.82	2.1650	5 41 10.1	12.697
21	13 50 26.79	2.1674	5 53 51.1	12.670
22	13 52 36.91	2.1699	6 6 30.5	12.643
23	13 54 47.18	2.1723	S. 6 19 8.3	12.615

WEDNESDAY 20.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	13 56 57.59	2.1748	S. 6 31 44.3	12.585
1	13 59 8.16	2.1775	6 44 18.5	12.554
2	14 1 18.89	2.1802	6 56 50.8	12.522
3	14 3 29.78	2.1829	7 9 21.2	12.489
4	14 5 40.84	2.1857	7 21 49.5	12.453
5	14 7 52.06	2.1884	7 34 15.6	12.417
6	14 10 3.45	2.1912	7 46 39.5	12.380
7	14 12 15.01	2.1942	7 59 1.2	12.342
8	14 14 26.75	2.1972	8 11 20.5	12.302
9	14 16 38.67	2.2002	8 23 37.4	12.261
10	14 18 50.77	2.2032	8 35 51.8	12.218
11	14 21 3.05	2.2062	8 48 3.6	12.175
12	14 23 15.51	2.2093	9 0 12.8	12.131
13	14 25 28.16	2.2125	9 12 19.3	12.085
14	14 27 41.01	2.2158	9 24 23.0	12.037
15	14 29 54.06	2.2191	9 36 23.8	11.988
16	14 32 7.30	2.2224	9 48 21.6	11.937
17	14 34 20.74	2.2258	10 0 16.3	11.886
18	14 36 34.39	2.2292	10 12 7.9	11.833
19	14 38 48.25	2.2326	10 23 56.3	11.780
20	14 41 2.31	2.2360	10 35 41.5	11.726
21	14 43 16.57	2.2394	10 47 23.4	11.670
22	14 45 31.04	2.2430	10 59 1.9	11.612
23	14 47 45.73	2.2467	11 10 36.9	11.553
24	14 50 0.64	2.2503	S. 11 22 8.3	11.493

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

THURSDAY 21.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	14 50 0.64	2.2503	S. 11 22 8.3	11.493
1	14 52 15.77	2.2540	11 33 36.1	11.432
2	14 54 31.12	2.2577	11 45 0.1	11.369
3	14 56 46.69	2.2614	11 56 20.3	11.305
4	14 59 2.49	2.2652	12 7 36.7	11.240
5	15 1 18.51	2.2689	12 18 49.1	11.173
6	15 3 34.76	2.2727	12 29 57.5	11.106
7	15 5 51.24	2.2766	12 41 1.8	11.037
8	15 8 7.96	2.2806	12 52 1.9	10.966
9	15 10 24.91	2.2845	13 2 57.7	10.894
10	15 12 42.10	2.2885	13 13 49.2	10.821
11	15 14 59.53	2.2924	13 24 36.3	10.747
12	15 17 17.19	2.2963	13 35 18.8	10.671
13	15 19 35.09	2.3004	13 45 56.8	10.595
14	15 21 53.24	2.3045	13 56 30.2	10.517
15	15 24 11.63	2.3085	14 6 58.8	10.437
16	15 26 30.26	2.3126	14 17 22.6	10.357
17	15 28 49.14	2.3167	14 27 41.6	10.276
18	15 31 8.27	2.3209	14 37 55.7	10.192
19	15 33 27.65	2.3250	14 48 4.7	10.107
20	15 35 47.27	2.3291	14 58 8.6	10.022
21	15 38 7.14	2.3332	15 8 7.3	9.935
22	15 40 27.26	2.3374	15 18 0.8	9.847
23	15 42 47.63	2.3417	S. 15 27 49.0	9.758

FRIDAY 22.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	15 45 8.26	2.3459	S. 15 37 31.8	9.667
1	15 47 29.14	2.3501	15 47 9.1	9.575
2	15 49 50.27	2.3542	15 56 40.8	9.482
3	15 52 11.65	2.3584	16 6 6.9	9.388
4	15 54 33.28	2.3626	16 15 27.3	9.292
5	15 56 55.16	2.3669	16 24 41.9	9.195
6	15 59 17.30	2.3711	16 33 50.7	9.097
7	16 1 39.69	2.3753	16 42 53.6	8.998
8	16 4 2.33	2.3795	16 51 50.5	8.897
9	16 6 25.23	2.3837	17 0 41.3	8.795
10	16 8 48.37	2.3878	17 9 25.9	8.692
11	16 11 11.76	2.3920	17 18 4.3	8.587
12	16 13 35.41	2.3962	17 26 36.4	8.482
13	16 15 59.31	2.4003	17 35 2.2	8.376
14	16 18 23.45	2.4044	17 43 21.5	8.268
15	16 20 47.84	2.4086	17 51 34.3	8.159
16	16 23 12 48	2.4127	17 59 40.6	8.050
17	16 25 37.36	2.4167	18 7 40.3	7.939
18	16 28 2.48	2.4207	18 15 33.3	7.827
19	16 30 27.84	2.4247	18 23 19.5	7.713
20	16 32 53.45	2.4288	18 30 58.8	7.598
21	16 35 19.30	2.4328	18 38 31.2	7.483
22	16 37 45.39	2.4367	18 45 56.7	7.367
23	16 40 11.71	2.4407	18 53 15.2	7.249
24	16 42 38.27	2.4446	S. 19 0 26.6	7.130

SATURDAY 23.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	16 42 38.27	2.4446	S. 19 0 26.6	7.130
1	16 45 5.06	2.4484	19 7 30.8	7.010
2	16 47 32.08	2.4522	19 14 27.8	6.888
3	16 49 59.32	2.4559	19 21 17.4	6.766
4	16 52 26.79	2.4596	19 27 59.7	6.643
5	16 54 54.48	2.4632	19 34 34.6	6.519
6	16 57 22.38	2.4668	19 41 2.0	6.394
7	16 59 50.50	2.4705	19 47 21.9	6.268
8	17 2 18.84	2.4741	19 53 34.2	6.142
9	17 4 47.39	2.4775	19 59 38.9	6.014
10	17 7 16.14	2.4809	20 5 35.9	5.885
11	17 9 45.10	2.4843	20 11 25.1	5.754
12	17 12 14.26	2.4876	20 17 6.4	5.623
13	17 14 43.61	2.4909	20 22 39.9	5.492
14	17 17 13.16	2.4941	20 28 5.5	5.360
15	17 19 42.90	2.4972	20 33 23.1	5.227
16	17 22 12.82	2.5002	20 38 32.7	5.092
17	17 24 42.92	2.5032	20 43 34.2	4.957
18	17 27 13.21	2.5062	20 48 27.6	4.822
19	17 29 43.67	2.5091	20 53 12.8	4.685
20	17 32 14.30	2.5118	20 57 49.8	4.547
21	17 34 45.09	2.5145	21 2 18.5	4.409
22	17 37 16.04	2.5171	21 6 38.9	4.271
23	17 39 47.14	2.5196	S. 21 10 51.0	4.132

SUNDAY 24.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	17 42 18.39	2.5221	S. 21 14 54.7	3.991
1	17 44 49.79	2.5245	21 18 49.9	3.850
2	17 47 21.33	2.5268	21 22 36.7	3.709
3	17 49 53.01	2.5291	21 26 15.0	3.567
4	17 52 24.82	2.5312	21 29 44.7	3.424
5	17 54 56.76	2.5333	21 33 5.8	3.281
6	17 57 28.82	2.5352	21 36 18.4	3.137
7	18 0 0.99	2.5371	21 39 22.3	2.992
8	18 2 33.27	2.5389	21 42 17.5	2.847
9	18 5 5.66	2.5406	21 45 4.0	2.702
10	18 7 38.14	2.5422	21 47 41.8	2.557
11	18 10 10.72	2.5437	21 50 10.9	2.411
12	18 12 43.39	2.5452	21 52 31.2	2.264
13	18 15 16.14	2.5465	21 54 42.6	2.117
14	18 17 48.97	2.5477	21 56 45.2	1.970
15	18 20 21.86	2.5487	21 58 39.0	1.822
16	18 22 54.81	2.5497	22 0 23.9	1.674
17	18 25 27.83	2.5507	22 1 59.9	1.527
18	18 28 0.90	2 5516	22 3 27.1	1.379
19	18 30 34.02	2.5523	22 4 45.4	1.230
20	18 33 7.18	2.5529	22 5 54.7	1.080
21	18 35 40.37	2.5533	22 6 55.0	0.931
22	18 38 13.58	2.5537	22 7 46.4	0.782
23	18 40 46.81	2.5540	22 8 28.9	0.634
24	18 43 20.06	2.5542	S. 22 9 2.5	0.485

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

MONDAY 25.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	18 43 20.06	2.5542	S.22 9 2.5	0.485
1	18 45 53.32	2.5543	22 9 27.1	0.335
2	18 48 26.58	2.5543	22 9 42.7	0.185
3	18 50 59.84	2.5542	22 9 49.3	− 0.036
4	18 53 33.09	2.5540	22 9 47.0	+ 0.113
5	18 56 6.32	2.5536	22 9 35.7	0.263
6	18 58 39.52	2.5532	22 9 15.4	0.412
7	19 1 12.70	2.5527	22 8 46.2	0.562
8	19 3 45.84	2.5520	22 8 8.0	0.711
9	19 6 18.94	2.5512	22 7 20.9	0.859
10	19 8 51.99	2.5504	22 6 24.9	1.007
11	19 11 24.99	2.5495	22 5 20.0	1.156
12	19 13 57.93	2.5484	22 4 6.2	1.304
13	19 16 30.80	2.5472	22 2 43.5	1.452
14	19 19 3.60	2.5459	22 1 12.0	1.599
15	19 21 36.31	2.5445	21 59 31.6	1.746
16	19 24 8.94	2.5431	21 57 42.4	1.893
17	19 26 41.48	2.5415	21 55 44.4	2.040
18	19 29 13.92	2.5398	21 53 37.6	2.187
19	19 31 46.26	2.5381	21 51 22.0	2.332
20	19 34 18.49	2.5362	21 48 57.7	2.477
21	19 36 50.60	2.5341	21 46 24.7	2.622
22	19 39 22.58	2.5319	21 43 43.0	2.767
23	19 41 54.43	2.5297	S.21 40 52.7	2.910

TUESDAY 26.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	19 44 26.15	2.5275	S.21 37 53.8	3.053
1	19 46 57.73	2.5252	21 34 46.3	3.196
2	19 49 29.17	2.5227	21 31 30.3	3.338
3	19 52 0.45	2.5201	21 28 5.7	3.480
4	19 54 31.58	2.5175	21 24 32.7	3.620
5	19 57 2.55	2.5147	21 20 51.3	3.760
6	19 59 33.35	2.5119	21 17 1.5	3.899
7	20 2 3.98	2.5090	21 13 3.4	4.038
8	20 4 34.43	2.5060	21 8 57.0	4.176
9	20 7 4.70	2.5029	21 4 42.3	4.313
10	20 9 34.78	2.4997	21 0 19.4	4.449
11	20 12 4.66	2.4963	20 55 48.4	4.584
12	20 14 34.34	2.4930	20 51 9.3	4.719
13	20 17 3.82	2.4897	20 46 22.1	4.852
14	20 19 33.10	2.4862	20 41 27.0	4.985
15	20 22 2.17	2.4827	20 36 23.9	5.117
16	20 24 31.02	2.4790	20 31 12.9	5.248
17	20 26 59.65	2.4752	20 25 54.1	5.378
18	20 29 28.05	2.4714	20 20 27.5	5.507
19	20 31 56.22	2.4676	20 14 53.2	5.636
20	20 34 24.16	2.4637	20 9 11.2	5.763
21	20 36 51.87	2.4597	20 3 21.6	5.889
22	20 39 19.33	2.4557	19 57 24.5	6.014
23	20 41 46.55	2.4516	19 51 19.9	6.138
24	20 44 13.52	2.4474	S.19 45 7.9	6.262

WEDNESDAY 27.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	20 44 13.52	2.4474	S.19 45 7.9	6.262
1	20 46 40.24	2.4432	19 38 48.5	6.383
2	20 49 6.70	2.4389	19 32 21.9	6.503
3	20 51 32.91	2.4346	19 25 48.1	6.623
4	20 53 58.85	2.4302	19 19 7.2	6.742
5	20 56 24.53	2.4257	19 12 19.1	6.860
6	20 58 49.94	2.4212	19 5 24.0	6.977
7	21 1 15.08	2.4167	18 58 21.9	7.092
8	21 3 39.95	2.4122	18 51 13.0	7.205
9	21 6 4.54	2.4075	18 43 57.3	7.317
10	21 8 28.85	2.4028	18 36 34.9	7.429
11	21 10 52.88	2.3981	18 29 5.8	7.540
12	21 13 16.63	2.3934	18 21 30.1	7.649
13	21 15 40.09	2.3887	18 13 47.9	7.757
14	21 18 3.27	2.3839	18 5 59.2	7.864
15	21 20 26.16	2.3791	17 58 4.2	7.969
16	21 22 48.76	2.3742	17 50 2.9	8.073
17	21 25 11.07	2.3693	17 41 55.4	8.176
18	21 27 33.08	2.3644	17 33 41.8	8.277
19	21 29 54.80	2.3595	17 25 22.1	8.378
20	21 32 16.22	2.3545	17 16 56.4	8.477
21	21 34 37.34	2.3495	17 8 24.8	8.575
22	21 36 58.16	2.3445	16 59 47.4	8.672
23	21 39 18.68	2.3395	S.16 51 4.2	8.767

THURSDAY 28.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	21 41 38.90	2.3345	S.16 42 15.4	8.860
1	21 43 58.82	2.3295	16 33 21.0	8.952
2	21 46 18.44	2.3244	16 24 21.1	9.044
3	21 48 37.75	2.3193	16 15 15.7	9.134
4	21 50 56.76	2.3143	16 6 5.0	9.222
5	21 53 15.47	2.3092	15 56 49.0	9.310
6	21 55 33.87	2.3042	15 47 27.8	9.396
7	21 57 51.97	2.2991	15 38 1.5	9.480
8	22 0 9.76	2.2940	15 28 30.2	9.562
9	22 2 27.25	2.2889	15 18 54.0	9.644
10	22 4 44.43	2.2838	15 9 12.9	9.725
11	22 7 1.31	2.2788	14 59 27.0	9.805
12	22 9 17.89	2.2737	14 49 36.3	9.883
13	22 11 34.16	2.2687	14 39 41.0	9.959
14	22 13 50.13	2.2637	14 29 41.2	10.033
15	22 16 5.80	2.2586	14 19 37.0	10.107
16	22 18 21.16	2.2535	14 9 28.4	10.180
17	22 20 36.22	2.2485	13 59 15.4	10.252
18	22 22 50.98	2.2435	13 48 58.2	10.321
19	22 25 5.44	2.2385	13 38 36.9	10.389
20	22 27 19.60	2.2335	13 28 11.5	10.457
21	22 29 33.46	2.2286	13 17 42.1	10.523
22	22 31 47.03	2.2237	13 7 8.8	10.587
23	22 34 0.30	2.2188	12 56 31.7	10.649
24	22 36 13.28	2.2139	S.12 45 50.9	10.710

GREENWICH MEAN TIME.

PHASES OF THE MOON.

		d	h	m
☽ First Quarter	Feb.	7	8	58.0
○ Full Moon		15	10	17.0
☾ Last Quarter		22	11	55.1

		d	h
☾ Apogee	Feb.	9	0.7
☾ Perigee		24	1.7

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff	IXh.	P. L. of Diff.
1	Sun	W.	14° 58′ 41″	2715	16° 35′ 1″	2725	18° 11′ 8″	2736	19° 47′ 0″	2749
	α Arietis	E.	69 30 37	2533	67 50 9	2551	66 10 6	2570	64 30 30	2590
	Aldebaran	E.	100 19 28	2359	98 34 55	2373	96 50 42	2388	95 6 50	2403
2	Sun	W.	27 41 41	2825	29 15 36	2842	30 49 10	2859	32 22 22	2875
	α Arietis	E.	56 19 45	2704	54 43 11	2730	53 7 11	2757	51 31 47	2785
	Aldebaran	E.	86 32 55	2481	84 51 15	2497	83 9 57	2513	81 29 2	2530
3	Sun	W.	40 2 53	2963	41 33 52	2981	43 4 29	2998	44 34 44	3016
	α Arietis	E.	43 44 33	2949	42 13 16	2987	40 42 47	3029	39 13 10	3073
	Aldebaran	E.	73 10 10	2612	71 31 32	2629	69 53 17	2646	68 15 24	2663
4	Sun	W.	52 0 33	3103	53 28 39	3119	54 56 25	3137	56 23 50	3153
	α Pegasi	W.	29 2 31	5223	29 56 35	4999	30 53 31	4809	31 53 0	4645
	Mars	W.	18 8 20	3101	19 36 28	3105	21 4 31	3111	22 32 27	3119
	Aldebaran	E.	60 11 32	2744	58 35 51	2760	57 0 30	2775	55 25 29	2790
	Pollux	E.	104 22 58	2770	102 47 51	2786	101 13 5	2801	99 38 39	2816
5	Sun	W.	63 36 9	3231	65 1 42	3245	66 26 58	3259	67 51 57	3274
	α Pegasi	W.	37 20 3	4107	38 29 58	4037	39 41 1	3975	40 53 5	3922
	Mars	W.	29 49 11	3173	31 15 52	3185	32 42 19	3196	34 8 33	3208
	Venus	W.	18 15 26	3436	19 37 2	3426	20 58 49	3422	22 20 41	3421
	Aldebaran	E.	47 35 18	2863	46 2 12	2877	44 29 24	2891	42 56 53	2903
	Pollux	E.	91 51 12	2887	90 18 37	2901	88 46 19	2914	87 14 18	2927
6	Sun	W.	74 52 56	3337	76 16 25	3348	77 39 41	3359	79 2 44	3369
	α Pegasi	W.	47 4 59	3736	48 21 8	3709	49 37 45	3687	50 54 46	3666
	Mars	W.	41 16 22	3261	42 41 19	3272	44 6 3	3282	45 30 35	3292
	Venus	W.	29 9 44	3436	30 31 20	3441	31 52 50	3447	33 14 13	3453
	Aldebaran	E.	35 18 17	2964	33 47 19	2974	32 16 34	2985	30 46 3	2996
	Pollux	E.	79 38 7	2986	78 7 37	2997	76 37 20	3007	75 7 16	3017
7	Sun	W.	85 55 15	3414	87 17 16	3422	88 39 8	3428	90 0 53	3434
	α Pegasi	W.	57 24 36	3592	58 43 19	3581	60 2 14	3571	61 21 20	3561
	Mars	W.	52 30 45	3331	53 54 21	3338	55 17 49	3345	56 41 9	3351
	Venus	W.	39 59 33	3481	41 20 18	3486	42 40 58	3490	44 1 33	3495
	Pollux	E.	67 39 49	3060	66 10 51	3068	64 42 2	3075	63 13 22	3082
	Saturn	E.	91 57 57	2997	90 27 41	3005	88 57 34	3011	87 27 35	3017
8	Sun	W.	96 48 3	3458	98 9 14	3461	99 30 22	3463	100 51 27	3466
	α Pegasi	W.	67 59 9	3525	69 19 6	3519	70 39 9	3513	71 59 19	3507
	Mars	W.	63 36 23	3371	64 59 13	3374	66 21 59	3376	67 44 43	3378
	Venus	W.	50 43 24	3510	52 3 37	3512	53 23 48	3514	54 43 57	3515
	Pollux	E.	55 51 54	3109	54 23 55	3114	52 56 2	3118	51 28 14	3121
	Saturn	E.	79 59 12	3038	78 29 46	3040	77 0 23	3043	75 31 3	3045
	Regulus	E.	91 31 4	3072	90 2 20	3074	88 33 39	3076	87 5 0	3078
9	Sun	W.	107 36 29	3468	108 57 29	3467	110 18 30	3465	111 39 33	3463
	Venus	W.	61 24 38	3512	62 44 49	3510	64 5 2	3507	65 25 18	3505
	α Arietis	W.	35 5 48	3550	36 25 17	3516	37 45 23	3487	39 6 2	3459
	Pollux	E.	44 10 13	3136	42 42 47	3138	41 15 24	3141	39 48 4	3143
	Saturn	E.	68 4 45	3046	66 35 29	3045	65 6 12	3043	63 36 53	3042

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Sun W.	21° 22′ 35″	2763	22° 57′ 51″	2778	24° 32′ 48″	2793	26° 7′ 25″	2809
	α Arietis E.	62 51 21	2611	61 12 41	2633	59 34 31	2656	57 56 52	2680
	Aldebaran E.	93 23 19	2418	91 40 10	2433	89 57 23	2449	88 14 58	2465
2	Sun W.	33 55 13	2892	35 27 42	2910	36 59 48	2927	38 31 32	2946
	α Arietis E.	49 57 0	2815	48 22 52	2845	46 49 23	2878	45 16 36	2912
	Aldebaran E.	79 48 30	2546	78 8 21	2563	76 28 35	2579	74 49 11	2596
3	Sun W.	46 4 37	3034	47 34 8	3051	49 3 18	3069	50 32 6	3086
	α Arietis E.	37 44 28	3121	36 16 44	3173	34 50 3	3230	33 24 29	3293
	Aldebaran E.	66 37 54	2679	65 0 46	2695	63 24 0	2711	61 47 35	2728
4	Sun W.	57 50 56	3169	59 17 42	3185	60 44 9	3200	62 10 18	3215
	α Pegasi W.	32 54 46	4505	33 58 34	4383	35 4 11	4278	36 11 24	4186
	Mars W.	24 0 13	3129	25 27 47	3140	26 55 8	3151	28 22 16	3162
	Aldebaran E.	53 50 48	2805	52 16 27	2820	50 42 25	2835	49 8 42	2849
	Pollux E.	98 4 32	2831	96 30 44	2845	94 57 15	2859	93 24 4	2874
5	Sun W.	69 16 39	3288	70 41 5	3300	72 5 16	3313	73 29 13	3325
	α Pegasi W.	42 6 2	3875	43 19 47	3833	44 34 15	3797	45 49 20	3765
	Mars W.	35 34 33	3220	37 0 19	3231	38 25 52	3241	39 51 13	3251
	Venus W.	23 42 34	3422	25 4 26	3423	26 26 16	3427	27 48 2	3431
	Aldebaran E.	41 24 38	2916	39 52 39	2928	38 20 56	2941	36 49 29	2953
	Pollux E.	85 42 33	2939	84 11 4	2951	82 39 50	2963	81 8 51	2975
6	Sun W.	80 25 36	3379	81 48 16	3388	83 10 46	3398	84 33 5	3406
	α Pegasi W.	52 12 9	3649	53 29 51	3632	54 47 51	3618	56 6 6	3604
	Mars W.	46 54 56	3300	48 19 7	3308	49 43 9	3317	51 7 1	3324
	Venus W.	34 35 30	3459	35 56 40	3464	37 17 44	3470	38 38 42	3476
	Aldebaran E.	29 15 45	3005	27 45 39	3015	26 15 45	3025	24 46 3	3034
	Pollux E.	73 37 24	3026	72 7 44	3035	70 38 15	3044	69 8 57	3052
7	Sun W.	91 22 31	3440	92 44 2	3445	94 5 28	3450	95 26 48	3454
	α Pegasi W.	62 40 37	3553	64 0 3	3545	65 19 37	3538	66 39 19	3531
	Mars W.	58 4 22	3356	59 27 29	3360	60 50 31	3364	62 13 29	3367
	Venus W.	45 22 3	3498	46 42 29	3502	48 2 51	3506	49 23 9	3508
	Pollux E.	61 44 50	3088	60 16 26	3094	58 48 9	3099	57 19 58	3105
	Saturn E.	85 57 43	3022	84 27 57	3026	82 58 17	3030	81 28 42	3034
8	Sun W.	102 12 29	3468	103 33 29	3468	104 54 29	3468	106 15 29	3468
	α Pegasi W.	73 19 35	3502	74 39 57	3497	76 0 25	3491	77 20 59	3487
	Mars W.	69 7 25	3379	70 30 6	3379	71 52 46	3379	73 15 26	3379
	Venus W.	56 4 5	3515	57 24 13	3515	58 44 21	3515	60 4 29	3514
	Pollux E.	50 0 30	3124	48 32 50	3128	47 5 14	3131	45 37 42	3133
	Saturn E.	74 1 46	3046	72 32 30	3047	71 3 15	3047	69 34 0	3047
	Regulus E.	85 36 23	3079	84 7 48	3080	82 39 14	3081	81 10 41	3081
9	Sun W.	113 0 38	3461	114 21 46	3458	115 42 57	3454	117 4 12	3450
	Venus W.	66 45 37	3501	68 6 0	3498	69 26 26	3494	70 46 57	3489
	α Arietis W.	40 27 12	3433	41 48 51	3410	43 10 56	3388	44 33 26	3367
	Pollux E.	38 20 46	3145	36 53 31	3148	35 26 20	3151	33 59 12	3155
	Saturn E.	62 7 32	3039	60 38 8	3036	59 8 40	3033	57 39 8	3030

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
9	Regulus	E.	79° 42′ 8″	3080	78° 13′ 34″	3079	76° 44′ 59″	3078	75° 16′ 22″	3075
10	Sun	W.	118 25 32	3446	119 46 56	3441	121 8 26	3436	122 30 2	3431
	Venus	W.	72 7 33	3484	73 28 15	3479	74 49 3	3473	76 9 57	3467
	α Arietis	W.	45 56 20	3348	47 19 36	3330	48 43 13	3313	50 7 10	3295
	Saturn	E.	56 9 32	3026	54 39 51	3021	53 10 4	3016	51 40 11	3010
	Regulus	E.	67 52 28	3059	66 23 28	3055	64 54 23	3050	63 25 12	3045
11	Sun	W.	129 19 44	3397	130 42 4	3389	132 4 33	3381	133 27 11	3373
	Venus	W.	82 56 23	3430	84 18 6	3422	85 39 58	3413	87 2 0	3404
	α Arietis	W.	57 11 38	3219	58 37 25	3205	60 3 28	3191	61 29 48	3177
	Aldebaran	W.	24 22 28	3020	25 52 16	3011	27 22 15	3001	28 52 26	2992
	Saturn	E.	44 8 57	2979	42 38 18	2971	41 7 29	2964	39 36 31	2956
	Regulus	E.	55 57 32	3014	54 27 36	3006	52 57 31	2998	51 27 16	2991
12	Venus	W.	93 54 49	3355	95 17 57	3345	96 41 17	3333	98 4 50	3323
	α Arietis	W.	68 45 33	3110	70 13 30	3097	71 41 43	3085	73 10 11	3072
	Aldebaran	W.	36 26 14	2945	37 57 36	2935	39 29 11	2924	41 0 59	2915
	Saturn	E.	31 59 4	2912	30 27 1	2903	28 54 46	2894	27 22 19	2884
	Regulus	E.	43 53 31	2949	42 22 14	2939	40 50 45	2931	39 19 5	2921
	Spica	E.	97 51 23	2973	96 20 37	2964	94 49 39	2954	93 18 28	2944
13	α Arietis	W.	80 36 23	3010	82 6 23	2998	83 36 38	2986	85 7 8	2974
	Aldebaran	W.	48 43 18	2861	50 16 27	2849	51 49 51	2838	53 23 29	2828
	Regulus	E.	31 37 46	2875	30 4 55	2866	28 31 52	2857	26 58 38	2848
	Spica	E.	85 39 20	2891	84 6 50	2881	82 34 7	2870	81 1 10	2859
14	α Arietis	W.	92 43 17	2919	94 15 12	2908	95 47 21	2897	97 19 44	2887
	Aldebaran	W.	61 15 19	2770	62 50 26	2760	64 25 47	2748	66 1 23	2737
	Pollux	W.	18 8 8	3060	19 37 6	3005	21 7 12	2961	22 38 14	2923
	Spica	E.	73 12 56	2806	71 38 36	2795	70 4 2	2785	68 29 14	2775
15	Aldebaran	W.	74 3 7	2681	75 40 12	2670	77 17 32	2660	78 55 6	2649
	Pollux	W.	30 23 47	2788	31 58 31	2767	33 33 42	2748	35 9 18	2730
	Spica	E.	60 31 55	2725	58 55 48	2716	57 19 29	2707	55 42 58	2698
	Antares	E.	106 25 55	2725	104 49 49	2713	103 13 27	2701	101 36 49	2690
16	Aldebaran	W.	87 6 31	2597	88 45 30	2588	90 24 42	2578	92 4 7	2569
	Pollux	W.	43 12 48	2655	44 50 29	2641	46 28 28	2629	48 6 44	2617
	Saturn	W.	19 5 23	2576	20 44 51	2565	22 24 34	2554	24 4 32	2544
	Spica	E.	47 37 40	2660	46 0 7	2655	44 22 26	2649	42 44 37	2644
	Antares	E.	93 30 3	2638	91 52 0	2628	90 13 43	2618	88 35 13	2609
17	Pollux	W.	56 22 2	2561	58 1 50	2551	59 41 52	2542	61 22 7	2533
	Saturn	W.	32 27 41	2498	34 8 57	2489	35 50 25	2482	37 32 4	2473
	Regulus	W.	20 21 45	2559	22 1 37	2545	23 41 48	2532	25 22 17	2520
	Spica	E.	34 34 21	2635	•32 56 13	2637	31 18 8	2641	29 40 9	2649
	Antares	E.	80 19 36	2565	78 39 53	2557	76 59 59	2550	75 19 55	2543
	Jupiter	E.	103 41 50	2578	102 2 25	2569	100 22 47	2560	98 42 57	2551
18	Pollux	W.	69 46 27	2491	71 27 53	2483	73 9 30	2475	74 51 18	2468
	Saturn	W.	46 3 8	2436	47 45 52	2429	49 28 46	2422	51 11 50	2415

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
9	Regulus	E.	73° 47′ 42″	3073	72° 18′ 59″	3070	70° 50′ 13″	3067	69° 21′ 23″	3063
10	Sun	W.	123 51 44	3425	125 13 32	3418	126 35 28	3411	127 57 32	3404
	Venus	W.	77 30 58	3460	78 52 7	3453	80 13 24	3446	81 34 49	3438
	α Arietis	W.	51 31 27	3279	52 56 3	3264	54 20 57	3248	55 46 9	3234
	Saturn	E.	50 10 11	3005	48 40 4	2998	47 9 49	2993	45 39 27	2986
	Regulus	E.	61 55 55	3039	60 26 31	3033	58 56 59	3027	57 27 20	3020
11	Sun	W.	134 49 58	3365	136 12 54	3356	137 36 1	3346	138 59 19	3337
	Venus	W.	88 24 12	3395	89 46 34	3386	91 9 7	3375	92 31 52	3365
	α Arietis	W.	62 56 25	3163	64 23 18	3150	65 50 27	3137	67 17 52	3124
	Aldebaran	W.	30 22 49	2983	31 53 23	2974	33 24 8	2965	34 55 5	2955
	Saturn	E.	38 5 23	2948	36 34 5	2939	35 2 36	2931	33 30 56	2921
	Regulus	E.	49 56 52	2983	48 26 18	2974	46 55 33	2965	45 24 37	2958
12	Venus	W.	99 28 35	3312	100 52 33	3301	102 16 43	3290	103 41 6	3278
	α Arietis	W.	74 38 55	3060	76 7 54	3047	77 37 8	3034	79 6 38	3022
	Aldebaran	W.	42 32 59	2904	44 5 13	2893	45 37 41	2882	47 10 23	2872
	Saturn	E.	25 49 40	2875	24 16 49	2865	22 43 45	2855	21 10 29	2845
	Regulus	E.	37 47 13	2912	36 15 9	2902	34 42 53	2893	33 10 25	2884
	Spica	E.	91 47 5	2934	90 15 29	2923	88 43 39	2912	87 11 36	2902
13	α Arietis	W.	86 37 53	2962	88 8 53	2951	89 40 7	2940	91 11 35	2929
	Aldebaran	W.	54 57 21	2816	56 31 28	2805	58 5 50	2793	59 40 27	2782
	Regulus	E.	25 25 12	2840	23 51 36	2833	22 17 51	2826	20 43 57	2820
	Spica	E.	79 27 59	2848	77 54 34	2838	76 20 55	2827	74 47 2	2817
14	α Arietis	W.	98 52 20	2877	100 25 8	2867	101 58 9	2858	103 31 22	2849
	Aldebaran	W.	67 37 14	2725	69 13 20	2714	70 49 41	2703	72 26 17	2692
	Pollux	W.	24 10 4	2890	25 42 36	2860	27 15 46	2833	28 49 31	2809
	Spica	E.	66 54 13	2764	65 18 58	2754	63 43 30	2744	62 7 49	2735
15	Aldebaran	W.	80 32 55	2638	82 10 58	2628	83 49 15	2618	85 27 46	2607
	Pollux	W.	36 45 18	2713	38 21 40	2698	39 58 23	2683	41 35 26	2669
	Spica	E.	54 6 16	2689	52 29 22	2682	50 52 18	2675	49 15 4	2667
	Antares	E.	99 59 56	2680	98 22 49	2669	96 45 28	2659	95 7 53	2648
16	Aldebaran	W.	93 43 45	2559	95 23 36	2550	97 3 40	2541	98 43 56	2532
	Pollux	W.	49 45 16	2604	51 24 5	2593	53 3 9	2583	54 42 28	2572
	Saturn	W.	25 44 44	2535	27 25 9	2525	29 5 47	2516	30 46 38	2507
	Spica	E.	41 6 42	2640	39 28 41	2637	37 50 36	2635	36 12 29	2635
	Antares	E.	86 56 30	2600	85 17 35	2591	83 38 27	2582	81 59 7	2574
17	Pollux	W.	63 2 35	2524	64 43 15	2515	66 24 7	2507	68 5 11	2498
	Saturn	W.	39 13 55	2465	40 55 57	2458	42 38 10	2450	44 20 34	2443
	Regulus	W.	27 3 2	2510	28 44 1	2500	30 25 14	2491	32 6 40	2482
	Spica	E.	28 2 20	2658	26 24 44	2672	24 47 26	2691	23 10 34	2716
	Antares	E.	73 39 41	2535	71 59 17	2528	70 18 43	2522	68 38 0	2515
	Jupiter	E.	97 2 55	2543	95 22 42	2536	93 42 19	2528	92 1 45	2521
18	Pollux	W.	76 33 16	2462	78 15 23	2455	79 57 40	2448	81 40 6	2443
	Saturn	W.	52 55 4	2408	54 38 27	2402	56 21 59	2396	58 5 39	2391

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
18	Regulus	W.	33° 48′ 19″	2478	35° 30′ 10″	2465	37° 12′ 12″	2458	38° 54′ 25″	2450
	Antares	E.	66 57 8	2510	65 16 8	2504	63 35 1	2499	61 53 46	2494
	JUPITER	E.	90 21 1	2513	88 40 6	2506	86 59 1	2499	85 17 47	2493
19	Pollux	W.	83 22 40	2436	85 5 23	2431	86 48 14	2425	88 31 13	2420
	SATURN	W.	59 49 27	2384	61 33 24	2379	63 17 29	2374	65 1 41	2368
	Regulus	W.	47 28 1	2417	49 11 12	2410	50 54 32	2405	52 38 0	2398
	Antares	E.	53 26 2	2475	51 44 14	2473	50 2 23	2472	48 20 30	2471
	JUPITER	E.	76 49 19	2461	75 7 11	2455	73 24 55	2450	71 42 32	2445
	α Aquilæ	E.	100 5 4	3055	98 35 59	3043	97 6 40	3033	95 37 8	3023
20	SATURN	W.	73 44 33	2345	75 29 27	2340	77 14 28	2335	78 59 36	2331
	Regulus	W.	61 17 17	2373	63 1 30	2368	64 45 50	2364	66 30 16	2360
	Antares	E.	39 51 2	2477	38 9 16	2481	36 27 36	2487	34 46 4	2494
	JUPITER	E.	63 8 46	2420	61 25 40	2415	59 42 27	2411	57 59 8	2407
	α Aquilæ	E.	88 7 8	2996	86 36 50	2994	85 6 30	2993	83 36 8	2993
	SUN	E.	122 26 56	2703	120 50 20	2698	119 13 38	2693	117 36 49	2689
21	SATURN	W.	87 46 40	2312	89 32 22	2309	91 18 9	2306	93 4 0	2303
	Regulus	W.	75 13 55	2341	76 58 55	2337	78 44 1	2333	80 29 12	2330
	Spica	W.	22 15 31	2570	23 55 7	2536	25 35 30	2503	27 16 32	2485
	JUPITER	E.	49 21 7	2387	47 37 14	2384	45 53 16	2380	44 9 13	2378
	α Aquilæ	E.	76 4 54	3014	74 34 58	3022	73 5 12	3030	71 35 37	3042
	SUN	E.	109 31 14	2667	107 53 50	2663	106 16 21	2660	104 38 47	2656
22	Regulus	W.	89 16 18	2315	91 1 56	2312	92 47 38	2310	94 33 23	2307
	Spica	W.	35 48 32	2408	37 31 56	2398	39 15 34	2389	40 59 25	2380
	JUPITER	E.	35 27 52	2363	33 43 24	2360	31 58 52	2357	30 14 16	2355
	α Aquilæ	E.	64 11 56	3127	62 44 19	3151	61 17 11	3177	59 50 34	3207
	SUN	E.	96 29 46	2640	94 51 45	2637	93 13 40	2634	91 35 31	2632
23	Spica	W.	49 41 17	2350	51 26 4	2345	53 10 58	2340	54 55 59	2336
	α Aquilæ	E.	52 47 39	3412	51 25 36	3467	50 4 35	3528	48 44 42	3598
	SUN	E.	83 23 58	2620	81 45 30	2618	80 7 0	2617	78 28 28	2615
24	Spica	W.	63 42 14	2323	65 27 40	2321	67 13 9	2320	68 58 40	2318
	Antares	W.	18 52 41	2689	20 29 35	2625	22 7 56	2575	23 47 25	2536
	SUN	E.	70 15 22	2610	68 36 41	2610	66 58 0	2610	65 19 18	2610
25	Spica	W.	77 46 33	2317	79 32 8	2317	81 17 42	2318	83 3 15	2320
	Antares	W.	32 15 24	2426	33 58 21	2415	35 41 34	2405	37 25 1	2397
	SUN	E.	57 5 59	2614	55 27 23	2616	53 48 50	2618	52 10 19	2621
26	Spica	W.	91 50 24	2331	93 35 39	2334	95 20 49	2337	97 5 54	2341
	Antares	W.	46 4 32	2376	47 48 41	2375	49 32 52	2375	51 17 3	2375
	JUPITER	W.	20 38 26	2350	22 23 12	2352	24 7 56	2355	25 52 36	2358
	SUN	E.	43 58 46	2638	42 20 43	2643	40 42 46	2648	39 4 56	2654
27	Spica	W.	105 49 44	2367	107 34 6	2373	109 18 19	2380	111 2 23	2387
	Antares	W.	59 57 37	2385	61 41 33	2389	63 25 24	2394	65 9 8	2398
	JUPITER	W.	34 34 37	2379	36 18 42	2384	38 2 39	2390	39 46 28	2396
	SUN	E.	30 58 4	2694	29 21 16	2704	27 44 41	2716	26 8 22	2729

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P.L. of Diff.	XVh.	P.L. of Diff.	XVIIIh.	P.L. of Diff.	XXIh.	P.L. of Diff.
18	Regulus	W.	40° 36′ 48″	2443	42° 19′ 22″	2436	44° 2′ 6″	2429	45° 44′ 59″	2423
	Antares	E.	60 12 25	2490	58 30 58	2486	56 49 25	2482	55 7 46	2478
	JUPITER	E.	83 36 24	2486	81 54 51	2480	80 13 9	2473	78 31 18	2467
19	Pollux	W.	90 14 19	2415	91 57 33	2410	93 40 54	2405	95 24 22	2401
	SATURN	W.	66 46 1	2364	68 30 28	2358	70 15 3	2353	71 59 45	2349
	Regulus	W.	54 21 37	2394	56 5 21	2389	57 49 12	2383	59 33 11	2378
	Antares	E.	46 38 36	2471	44 56 42	2470	43 14 47	2471	41 32 53	2473
	JUPITER	E.	70 0 2	2440	68 17 24	2434	66 34 38	2429	64 51 45	2425
	α Aquilæ	E.	94 7 24	3016	92 37 31	3009	91 7 30	3004	89 37 22	2999
20	SATURN	W.	80 44 50	2398	82 30 9	2394	84 15 34	2390	86 1 4	2316
	Regulus	W.	68 14 48	2356	69 59 26	2352	71 44 10	2348	73 29 0	2344
	Antares	E.	33 4 42	2504	31 23 34	2516	29 42 43	2531	28 2 13	2551
	JUPITER	E.	56 15 43	2403	54 32 12	2399	52 48 36	2395	51 4 54	2391
	α Aquilæ	E.	82 5 46	2994	80 35 26	2997	79 5 10	3001	77 34 59	3006
	SUN	E.	115 59 54	2684	114 22 53	2680	112 45 46	2675	111 8 33	2671
21	SATURN	W.	94 49 55	2300	96 35 55	2296	98 22 0	2294	100 8 9	2290
	Regulus	W.	82 14 28	2326	83 59 49	2324	85 45 14	2320	87 30 44	2317
	Spica	W.	28 58 7	2465	30 40 10	2448	32 22 37	2433	34 5 25	2419
	JUPITER	E.	42 25 6	2374	40 40 54	2371	38 56 37	2368	37 12 16	2366
	α Aquilæ	E.	70 6 16	3055	68 37 11	3070	67 8 25	3087	65 39 59	3105
	SUN	E.	103 1 8	2652	101 23 24	2649	99 45 36	2646	98 7 43	2643
22	Regulus	W.	96 19 12	2304	98 5 5	2302	99 51 1	2300	101 37 0	2298
	Spica	W.	42 43 28	2373	44 27 42	2366	46 12 5	2360	47 56 37	2355
	JUPITER	E.	28 29 37	2353	26 44 55	2352	25 0 11	2350	23 15 24	2348
	α Aquilæ	E.	58 24 33	3240	56 59 11	3276	55 34 31	3317	54 10 39	3362
	SUN	E.	89 57 19	2629	88 19 4	2626	86 40 45	2624	85 2 23	2622
23	Spica	W.	56 41 6	2333	58 26 17	2331	60 11 32	2328	61 56 51	2325
	α Aquilæ	E.	47 26 5	3674	46 8 50	3759	44 53 5	3855	43 38 59	3961
	SUN	E.	76 49 54	2614	75 11 18	2613	73 32 41	2612	71 54 2	2611
24	Spica	W.	70 44 13	2317	72 29 48	2317	74 15 23	2317	76 0 58	2317
	Antares	W.	25 27 48	2504	27 8 55	2480	28 50 37	2459	30 32 48	2441
	SUN	E.	63 40 37	2610	62 1 56	2611	60 23 16	2612	58 44 37	2612
25	Spica	W.	84 48 46	2321	86 34 15	2323	88 19 41	2325	90 5 4	2327
	Antares	W.	39 8 40	2391	40 52 28	2385	42 36 24	2381	44 20 26	2378
	SUN	E.	50 31 52	2624	48 53 29	2626	47 15 10	2629	45 36 55	2634
26	Spica	W.	98 50 54	2345	100 35 48	2350	102 20 35	2355	104 5 14	2362
	Antares	W.	53 1 14	2375	54 45 24	2377	56 29 32	2379	58 13 37	2382
	JUPITER	W.	27 37 11	2362	29 21 41	2365	31 6 6	2369	32 50 25	2374
	SUN	E.	37 27 14	2660	35 49 41	2668	34 12 18	2675	32 35 5	2684
27	Spica	W.	112 46 17	2394	114 30 0	2403	116 13 31	2411	117 56 50	2420
	Antares	W.	66 52 46	2403	68 36 16	2409	70 19 38	2415	72 2 51	2422
	JUPITER	W.	41 30 8	2403	43 13 39	2410	44 57 0	2417	46 40 11	2424
	SUN	E.	24 32 21	2744	22 56 40	2761	21 21 21	2780	19 46 27	2803

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Frid.	1	22 50 25.39	9.355	S. 7 23 23.2	+57.12	16 10.27	65.40	12 28.05	0.500
Sat.	2	22 54 9.64	9.335	7 0 29.1	57.38	16 10.03	65.32	12 15.78	0.520
SUN.	3	22 57 53.41	9.315	6 37 29.1	57.62	16 9.78	65.25	12 3.04	0.540
Mon.	4	23 1 36.72	9.296	6 14 23.5	+57.84	16 9.53	65.18	11 49.83	0.559
Tues.	5	23 5 19.57	9.277	5 51 12.8	58.04	16 9.28	65.11	11 36.16	0.578
Wed.	6	23 9 1.98	9.259	5 27 57.4	58.23	16 9.03	65.05	11 22.05	0.596
Thur.	7	23 12 43.95	9.241	5 4 37.7	+58.40	16 8.78	65.00	11 7.52	0.613
Frid.	8	23 16 25.53	9.225	4 41 14.1	58.55	16 8.53	64.95	10 52.59	0.629
Sat.	9	23 20 6.74	9.209	4 17 47.0	58.69	16 8.27	64.90	10 37.28	0.645
SUN.	10	23 23 47.58	9.194	3 54 16.8	+58.81	16 8.01	64.85	10 21.61	0.660
Mon.	11	23 27 28.07	9.180	3 30 43.9	58.92	16 7.75	64.81	10 5.59	0.674
Tues.	12	23 31 8.23	9.167	3 7 8.6	59.00	16 7.49	64.76	9 49.24	0.687
Wed.	13	23 34 48.09	9.155	2 43 31.3	+59.08	16 7.23	64.72	9 32.59	0.699
Thur.	14	23 38 27.68	9.144	2 19 52.4	59.15	16 6.97	64.68	9 15.67	0.710
Frid.	15	23 42 7.01	9.134	1 56 12.2	59.20	16 6.70	64.65	8 58.50	0.720
Sat.	16	23 45 46.11	9.125	1 32 31.1	+59.23	16 6.43	64.62	8 41.10	0.729
SUN.	17	23 49 25.01	9.117	1 8 49.5	59.24	16 6.16	64.59	8 23.49	0.737
Mon.	18	23 53 3.73	9.110	0 45 7.7	59.24	16 5.89	64.56	8 5.70	0.744
Tues.	19	23 56 42.29	9.104	S. 0 21 25.9	+59.23	16 5.61	64.54	7 47.76	0.750
Wed.	20	0 0 20.71	9.099	N. 0 2 15.4	59.21	16 5.33	64.52	7 29.68	0.755
Thur.	21	0 3 59.02	9.095	0 25 55.9	59.17	16 5.05	64.50	7 11.50	0.759
Frid.	22	0 7 37.26	9.092	0 49 35.3	+59.11	16 4.77	64.49	6 53.23	0.762
Sat.	23	0 11 15.43	9.089	1 13 13.2	59.04	16 4.49	64.48	6 34.90	0.765
SUN.	24	0 14 53.55	9.088	1 36 49.3	58.96	16 4.21	64.47	6 16.51	0.766
Mon.	25	0 18 31.64	9.087	2 0 23.2	+58.87	16 3.92	64.47	5 58.10	0.767
Tues.	26	0 22 9.73	9.087	2 23 54.7	58.76	16 3.64	64.47	5 39.69	0.767
Wed.	27	0 25 47.84	9.088	2 47 23.3	58.63	16 3.36	64.47	5 21.29	0.766
Thur.	28	0 29 25.98	9.090	3 10 48.6	+58.48	16 3.08	64.47	5 2.92	0.764
Frid.	29	0 33 4.17	9.092	3 34 10.2	58.32	16 2.79	64.47	4 44.61	0.762
Sat.	30	0 36 42.43	9.095	3 57 27.9	58.14	16 2.51	64.48	4 26.38	0.759
SUN.	31	0 40 20.78	9.099	4 20 41.3	57.95	16 2.23	64.49	4 8.23	0.755
Mon.	32	0 43 59.22	9.104	N. 4 43 50.1	+57.75	16 1.95	64.51	3 50.16	0.750

NOTE.—The mean time of semidiameter passing may be found by subtracting $0^{s}.18$ from the sidereal time.
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; north declinations, increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	s	m s	s	h m s
Frid.	1	22 50 23.44	9.356	S. 7 23 35.2	+57.13	12 28.15	0.500	22 37 55.29
Sat.	2	22 54 7.73	9.336	7 0 40.9	57.39	12 15.88	0.520	22 41 51.85
SUN.	3	22 57 51.54	9.316	6 37 40.6	57.63	12 3.14	0.540	22 45 48.40
Mon.	4	23 1 34.88	9.297	6 14 34.8	+57.85	11 49.93	0.559	22 49 44.95
Tues.	5	23 5 17.77	9.278	5 51 24.0	58.05	11 36.27	0.578	22 53 41.50
Wed.	6	23 9 0.22	9.260	5 28 8.4	58.24	11 22.16	0.596	22 57 38.06
Thur.	7	23 12 42.25	9.243	5 4 48.5	+58.41	11 7.63	0.613	23 1 34.62
Frid.	8	23 16 23.87	9.227	4 41 24.7	58.56	10 52.70	0.629	23 5 31.17
Sat.	9	23 20 5.11	9.211	4 17 57.4	58.70	10 37.39	0.645	23 9 27.72
SUN.	10	23 23 45.99	9.196	3 54 27.0	+58.82	10 21.72	0.660	23 13 24.27
Mon.	11	23 27 26.52	9.182	3 30 53.8	58.93	10 5.70	0.674	23 17 20.82
Tues.	12	23 31 6.72	9.169	3 7 18.2	59.01	9 49.35	0.687	23 21 17.37
Wed.	13	23 34 46.63	9.157	2 43 40.7	+59.09	9 32.70	0.699	23 25 13.93
Thur.	14	23 38 26.26	9.146	2 20 1.6	59.16	9 15.78	0.710	23 29 10.48
Frid.	15	23 42 5.64	9.136	1 56 21.1	59.21	8 58.61	0.720	23 33 7.03
Sat.	16	23 45 44.79	9.127	1 32 39.7	+59.24	8 41.20	0.729	23 37 3.59
SUN.	17	23 49 23.73	9.119	1 8 57.8	59.25	8 23.59	0.737	23 41 0.14
Mon.	18	23 53 2.49	9.112	0 45 15.7	59.25	8 5.80	0.744	23 44 56.69
Tues.	19	23 56 41.10	9.106	S. 0 21 33.6	+59.24	7 47.86	0.750	23 48 53.24
Wed.	20	0 0 19.57	9.101	N. 0 2 8.0	59.22	7 29.78	0.755	23 52 49.79
Thur.	21	0 3 57.93	9.097	0 25 48.8	59.18	7 11.59	0.759	23 56 46.34
Frid.	22	0 7 36.21	9.094	0 49 28.5	+59.12	6 53.32	0.762	0 0 42.89
Sat.	23	0 11 14.43	9.091	1 13 6.7	59.05	6 34.98	0.765	0 4 39.45
SUN.	24	0 14 52.60	9.090	1 36 43.1	58.97	6 16.59	0.766	0 8 36.01
Mon.	25	0 18 30.74	9.089	2 0 17.3	+58.88	5 58.18	0.767	0 12 32.56
Tues.	26	0 22 8.88	9.089	2 23 49.1	58.77	5 39.77	0.767	0 16 29.11
Wed.	27	0 25 47.03	9.090	2 47 18.0	58.64	5 21.37	0.766	0 20 25.66
Thur.	28	0 29 25.21	9.092	3 10 43.6	+58.49	5 2.99	0.764	0 24 22.22
Frid.	29	0 33 3.45	9.094	3 34 5.6	58.33	4 44.68	0.762	0 28 18.77
Sat.	30	0 36 41.76	9.097	3 57 23.6	58.15	4 26.44	0.759	0 32 15.32
SUN.	31	0 40 20.15	9.101	4 20 37.3	57.96	4 8.28	0.755	0 36 11.87
Mon.	32	0 43 58.63	9.106	N. 4 43 46.4	+57.76	3 50.21	0.750	0 40 8.42

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; north declinations, increasing.

Diff. for 1 Hour,
$+9^{s}.8565$.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S							Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.		
		λ	λ′						
		° ′ ″	′ ″	″	″				h m s
1	60	341 8 34.4	8 41.9	150.44	− 0.39	9.9962844	+46.0		1 21 51.26
2	61	342 8 44.1	8 51.5	150.37	0.47	9.9963950	46.1		1 17 55.35
3	62	343 8 52.0	8 59.3	150.29	0.53	9.9965060	46.3		1 13 59.44
4	63	344 8 57.9	9 5.1	150.21	− 0.56	9.9966174	+46.5		1 10 3.53
5	64	345 9 1.8	9 8.9	150.12	0.56	9.9967293	46.7		1 6 7.63
6	65	346 9 3.6	9 10.6	150.03	0.54	9.9968416	46.9		1 2 11.72
7	66	347 9 3.3	9 10.2	149.94	− 0.48	9.9969543	+47.1		0 58 15.81
8	67	348 9 0.8	9 7.6	149.85	0.39	9.9970676	47.4		0 54 19.91
9	68	349 8 56.0	9 2.7	149.75	0.28	9.9971816	47.7		0 50 24.00
10	69	350 8 49.0	8 55.6	149.66	− 0.16	9.9972964	+48.0		0 46 28.09
11	70	351 8 39.8	8 46.3	149.57	− 0.03	9.9974120	48.4		0 42 32.18
12	71	352 8 28.3	8 34.8	149.48	+ 0.10	9.9975286	48.8		0 38 36.27
13	72	353 8 14.6	8 21.0	149.39	+ 0.23	9.9976463	+49.3		0 34 40.37
14	73	354 7 58.8	8 5.1	149.30	0.34	9.9977651	49.7		0 30 44.46
15	74	355 7 40.9	7 47.1	149.21	0.44	9.9978850	50.2		0 26 48.55
16	75	356 7 20.9	7 27.0	149.12	+ 0.52	9.9980059	+50.6		0 22 52.64
17	76	357 6 58.8	7 4.8	149.04	0.57	9.9981280	51.1		0 18 56.74
18	77	358 6 34.7	6 40.6	148.96	0.59	9.9982513	51.5		0 15 0.84
19	78	359 6 8.7	6 14.5	148.88	+ 0.57	9.9983756	+51.9		0 11 4.93
20	79	0 5 40.8	5 46.5	148.80	0.52	9.9985008	52.3		0 7 9.03
21	80	1 5 11.1	5 16.8	148.72	0.45	9.9986268	52.6		0 3 13.13 23 59 17.22
22	81	2 4 39.6	4 45.2	148.65	+ 0.36	9.9987534	+52.9		23 55 21.31
23	82	3 4 6.3	4 11.8	148.58	0.25	9.9988806	53.1		23 51 25.40
24	83	4 3 31.3	3 36.7	148.51	+ 0.12	9.9990083	53.2		23 47 29.49
25	84	5 2 54.5	2 59.8	148.43	− 0.01	9.9991362	+53.2		23 43 33.58
26	85	6 2 15.9	2 21.1	148.36	0.14	9.9992639	53.2		23 39 37.67
27	86	7 1 35.5	1 40.6	148.28	0.26	9.9993915	53.1		23 35 41.76
28	87	8 0 53.3	0 58.3	148.21	− 0.37	9.9995189	+53.0		23 31 45.86
29	88	9 0 9.2	0 14.1	148.13	0.46	9.9996460	52.9		23 27 49.95
30	89	9 59 23.2	59 28.0	148.05	0.53	9.9997726	52.7		23 23 54.04
31	90	10 58 35.3	58 40.0	147.96	0.57	9.9998986	52.4		23 19 58.14
32	91	11 57 45.3	57 50.0	147.87	− 0.58	0.0000240	+52.1		23 16 2.24

NOTE.—The numbers in column λ correspond to the true equinox of the date; in column λ′, to the mean equinox of January $0^{d}.0$.

Diff. for 1 Hour,
$-9^{s}.8296$.
(Table II.)

GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	15 49.1	15 44.4	57 56.5	−1.40	57 39.1	−1.50	☌		29.1
2	15 39.3	15 34.1	57 20.6	1.57	57 1.4	1.62	0 47.7	2.00	0.6
3	15 28.8	15 23.4	56 41.8	1.63	56 22.2	1.62	1 34.6	1.91	1.6
4	15 18.2	15 13.1	56 2.9	−1.58	55 44 3	−1.51	2 19.7	1.85	2.6
5	15 8.3	15 3.9	55 26.7	1.41	55 10.4	1.29	3 3.8	1.83	3.6
6	14 59.9	14 56.5	54 55.8	1.14	54 43.1	0.97	3 47.8	1.84	4.6
7	14 53.6	14 51.3	54 32.5	−0.79	54 24.2	−0.59	4 32.2	1.87	5.6
8	14 49.7	14 48.8	54 18.3	−0.38	54 14.9	−0.17	5 17.6	1.92	6.6
9	14 48.6	14 49.1	54 14.2	+0.05	54 16.1	+0.27	6 4.4	1.98	7.6
10	14 50.3	14 52.3	54 20.6	+0.49	54 27.7	+0.70	6 52.6	2.04	8.6
11	14 54.9	14 58.1	54 37.3	0.90	54 49.3	1.09	7 42.1	2.08	9.6
12	15 2.0	15 6.4	55 3.5	1.26	55 19.6	1.42	8 32.3	2.10	10.6
13	15 11.3	15 16.5	55 37.5	+1.55	55 56.8	+1.65	9 22.8	2.10	11.6
14	15 22.0	15 27.8	56 17.1	1.73	56 38.2	1.77	10 13.0	2.08	12.6
15	15 33.6	15 39.4	56 59.6	1.78	57 21.0	1.76	11 2.8	2.06	13.6
16	15 45.1	15 50.5	57 41.8	+1.70	58 1.7	+1.61	11 52.2	2.05	14.6
17	15 55.6	16 0.2	58 20.3	1.48	58 37.2	1.33	12 41.6	2.06	15.6
18	16 4.3	16 7.8	58 52.2	1.16	59 5.1	0.98	13 31.4	2.10	16.6
19	16 10.7	16 12.9	59 15.7	+0.78	59 23.8	+0.58	14 22.5	2.17	17.6
20	16 14.5	16 15.4	59 29.6	0.38	59 33.0	+0.19	15 15.5	2.25	18.6
21	16 15.7	16 15.5	59 34.2	+0.01	59 33.3	−0.16	16 10.7	2.35	19.6
22	16 14.7	16 13.5	59 30.6	−0.30	59 26.2	−0.43	17 8.1	2.43	20.6
23	16 11.9	16 10.0	59 20.3	0.54	59 13.2	0.64	18 7.0	2.47	21.6
24	16 7.8	16 5.3	59 5.0	0.72	58 55.9	0.79	19 6.0	2.44	22.6
25	16 2.6	15 59.7	58 46.0	−0.86	58 35.3	−0.92	20 3.8	2.36	23.6
26	15 56.6	15 53.3	58 24.0	0.97	58 12.0	1.02	20 59.1	2.24	24.6
27	15 49.9	15 46.4	57 59.5	1.07	57 46.4	1.11	21 51.4	2.11	25.6
28	15 42.7	15 38.8	57 32.8	−1.16	57 18.7	−1.20	22 40.8	2.00	26.6
29	15 34.8	15 30.8	57 4.1	1.23	56 49.2	1.26	23 27.8	1.91	27.6
30	15 26.6	15 22.4	56 33.9	1.28	56 18.5	1.28	☌		28.6
31	15 18.2	15 14.1	56 3.1	1.28	55 47.9	1.26	0 13.0	1.86	0.0
32	15 10.0	15 6.1	55 33.0	−1.22	55 18.7	−1.16	0 57.3	1.83	1.0

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	FRIDAY 1.					**SUNDAY 3.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	22 36 13.28	2.2139	S. 12 45 50.9	10.710	0	0 17 28.45	2.0211	S. 3 24 51.6	12.204
1	22 38 25.97	2.2090	12 35 6.5	10.771	1	0 19 29.63	2.0182	3 12 39.3	12.207
2	22 40 38.36	2.2041	12 24 18.4	10.831	2	0 21 30.64	2.0154	3 0 26.8	12.210
3	22 42 50.46	2.1993	12 13 26.8	10.888	3	0 23 31.48	2.0126	2 48 14.1	12.212
4	22 45 2.27	2.1945	12 2 31.8	10.945	4	0 25 32.15	2.0098	2 36 1.4	12.212
5	22 47 13.80	2.1897	11 51 33.4	11.000	5	0 27 32.65	2.0070	2 23 48.7	12.211
6	22 49 25.04	2.1850	11 40 31.8	11.053	6	0 29 32.99	2.0044	2 11 36.1	12.209
7	22 51 36.00	2.1803	11 29 27.0	11.106	7	0 31 33.18	2.0019	1 59 23.6	12.207
8	22 53 46.68	2.1756	11 18 19.1	11.157	8	0 33 33.22	1.9993	1 47 11.3	12.203
9	22 55 57.07	2.1709	11 7 8.2	11.207	9	0 35 33.10	1.9968	1 34 59.3	12.198
10	22 58 7.19	2.1663	10 55 54.3	11.256	10	0 37 32.84	1.9945	1 22 47.5	12.193
11	23 0 17.03	2.1617	10 44 37.5	11.303	11	0 39 32.44	1.9922	1 10 36.1	12.187
12	23 2 26.59	2.1571	10 33 18.0	11.348	12	0 41 31.90	1.9899	0 58 25.1	12.179
13	23 4 35.88	2.1526	10 21 55.8	11.393	13	0 43 31.22	1.9876	0 46 14.6	12.171
14	23 6 44.90	2.1482	10 10 30.9	11.437	14	0 45 30.41	1.9853	0 34 4.6	12.162
15	23 8 53.66	2.1437	9 59 3.4	11.479	15	0 47 29.46	1.9831	0 21 55.1	12.152
16	23 11 2.15	2.1393	9 47 33.4	11.520	16	0 49 28.38	1.9810	S. 0 9 46.3	12.141
17	23 13 10.38	2.1349	9 36 1.0	11.559	17	0 51 27.18	1.9790	N. 0 2 21.8	12.129
18	23 15 18.34	2.1305	9 24 26.3	11.597	18	0 53 25.86	1.9770	0 14 29.2	12.117
19	23 17 26.04	2.1262	9 12 49.3	11.635	19	0 55 24.42	1.9750	0 26 35.8	12.103
20	23 19 33.49	2.1220	9 1 10.1	11.671	20	0 57 22.86	1.9731	0 38 41.5	12.088
21	23 21 40.68	2.1178	8 49 28.8	11.705	21	0 59 21.19	1.9713	0 50 46.4	12.073
22	23 23 47.62	2.1136	8 37 45.5	11.738	22	1 1 19.41	1.9695	1 2 50.3	12.057
23	23 25 54.31	2.1095	S. 8 26 0.2	11.771	23	1 3 17.53	1.9677	N. 1 14 53.2	12.039
	SATURDAY 2.					**MONDAY 4.**			
0	23 28 0.76	2.1054	S. 8 14 13.0	11.802	0	1 5 15.54	1.9660	N. 1 26 55.0	12.021
1	23 30 6.96	2.1013	8 2 24.0	11.832	1	1 7 13.45	1.9641	1 38 55.7	12.003
2	23 32 12.92	2.0973	7 50 33.2	11.861	2	1 9 11.27	1.9626	1 50 55.3	11.984
3	23 34 18.64	2.0933	7 38 40.7	11.888	3	1 11 8.99	1.9612	2 2 53.8	11.964
4	23 36 24.12	2.0894	7 26 46.6	11.914	4	1 13 6.62	1.9598	2 14 51.0	11.942
5	23 38 29.37	2.0856	7 14 51.0	11.939	5	1 15 4.17	1.9584	2 26 46.8	11.919
6	23 40 34.39	2.0817	7 2 53.9	11.963	6	1 17 1.63	1.9570	2 38 41.3	11.896
7	23 42 39.18	2.0779	6 50 55.4	11.986	7	1 18 59.01	1.9557	2 50 34.4	11.873
8	23 44 43.74	2.0742	6 38 55.6	12.007	8	1 20 56.31	1.9544	3 2 26.1	11.849
9	23 46 48.08	2.0705	6 26 54.5	12.028	9	1 22 53.54	1.9532	3 14 16.3	11.824
10	23 48 52.20	2.0669	6 14 52.2	12.047	10	1 24 50.69	1.9520	3 26 5.0	11.798
11	23 50 56.11	2.0633	6 2 48.8	12.066	11	1 26 47.78	1.9509	3 37 52.1	11.771
12	23 52 59.80	2.0597	5 50 44.3	12.083	12	1 28 44.80	1.9498	3 49 37.5	11.744
13	23 55 3.28	2.0562	5 38 38.8	12.099	13	1 30 41.76	1.9488	4 1 21.3	11.716
14	23 57 6.55	2.0528	5 26 32.4	12.114	14	1 32 38.66	1.9478	4 13 3.4	11.687
15	23 59 9.62	2.0494	5 14 25.1	12.128	15	1 34 35.50	1.9469	4 24 43.7	11.657
16	0 1 12.48	2.0460	5 2 17.0	12.141	16	1 36 32.29	1.9461	4 36 22.2	11.626
17	0 3 15.14	2.0427	4 50 8.2	12.152	17	1 38 29.03	1.9453	4 47 58.8	11.594
18	0 5 17.61	2.0395	4 37 58.8	12.162	18	1 40 25.72	1.9445	4 59 33.5	11.562
19	0 7 19.88	2.0363	4 25 48.8	12.172	19	1 42 22.37	1.9438	5 11 6.3	11.530
20	0 9 21.96	2.0332	4 13 38.2	12.181	20	1 44 18.98	1.9432	5 22 37.1	11.497
21	0 11 23.86	2.0301	4 1 27.1	12.188	21	1 46 15.55	1.9425	5 34 5.9	11.463
22	0 13 25.57	2.0270	3 49 15.6	12.195	22	1 48 12.08	1.9419	5 45 32.6	11.428
23	0 15 27.10	2.0240	3 37 3.7	12.200	23	1 50 8.58	1.9414	5 56 57.2	11.393
24	0 17 28.45	2.0211	S. 3 24 51.6	12.204	24	1 52 5.05	1.9409	N. 6 8 19.7	11.357

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	TUESDAY 5.					THURSDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	1 52 5.05	1.9409	N. 6 8 19.7	11.357	0	3 25 33.82	1.9697	N.14 19 24.7	8.875
1	1 54 1.49	1.9405	6 19 40.0	11.319	1	3 27 32.05	1.9713	14 28 15.2	8.808
2	1 55 57.91	1.9402	6 30 58.0	11.281	2	3 29 30.38	1.9729	14 37 1.7	8.742
3	1 57 54.31	1.9399	6 42 13.7	11.243	3	3 31 28.80	1.9744	14 45 44.2	8.675
4	1 59 50.69	1.9396	6 53 27.1	11.204	4	3 33 27.31	1.9760	14 54 22.7	8.608
5	2 1 47.06	1.9393	7 4 38.2	11.165	5	3 35 25.92	1.9777	15 2 57.2	8.541
6	2 3 43.41	1.9391	7 15 46.9	11.124	6	3 37 24.63	1.9793	15 11 27.6	8.472
7	2 5 39.75	1.9390	7 26 53.1	11.083	7	3 39 23.44	1.9810	15 19 53.8	8.402
8	2 7 36.09	1.9389	7 37 56.8	11.041	8	3 41 22.35	1.9828	15 28 15.8	8.332
9	2 9 32.42	1.9388	7 48 58.0	10.999	9	3 43 21.37	1.9846	15 36 33.7	8.262
10	2 11 28.75	1.9388	7 59 56.7	10.957	10	3 45 20.50	1.9863	15 44 47.3	8.192
11	2 13 25.08	1.9388	8 10 52.8	10.913	11	3 47 19.73	1.9881	15 52 56.7	8.121
12	2 15 21.41	1.9389	8 21 46.3	10.869	12	3 49 19.07	1.9899	16 1 1.8	8.049
13	2 17 17.75	1.9391	8 32 37.1	10.824	13	3 51 18.52	1.9918	16 9 2.6	7.976
14	2 19 14.10	1.9393	8 43 25.1	10.778	14	3 53 18.08	1.9937	16 16 59.0	7.903
15	2 21 10.46	1.9395	8 54 10.4	10.732	15	3 55 17.76	1.9956	16 24 51.0	7.830
16	2 23 6.84	1.9398	9 4 52.9	10.685	16	3 57 17.55	1.9975	16 32 38.6	7.757
17	2 25 3.24	1.9402	9 15 32.6	10.637	17	3 59 17.46	1.9994	16 40 21.8	7.682
18	2 26 59.66	1.9406	9 26 9.4	10.589	18	4 1 17.48	2.0013	16 48 0.5	7.607
19	2 28 56.11	1.9410	9 36 43.3	10.541	19	4 3 17.62	2.0033	16 55 34.7	7.532
20	2 30 52.58	1.9413	9 47 14.3	10.492	20	4 5 17.88	2.0053	17 3 4.4	7.457
21	2 32 49.07	1.9417	9 57 42.3	10.442	21	4 7 18.26	2.0073	17 10 29.5	7.380
22	2 34 45.59	1.9423	10 8 7.3	10.391	22	4 9 18.76	2.0094	17 17 50.0	7.303
23	2 36 42.15	1.9429	N.10 18 29.2	10.340	23	4 11 19.39	2.0115	N.17 25 5.9	7.226
	WEDNESDAY 6.					FRIDAY 8.			
0	2 38 38.74	1.9435	N.10 28 48.1	10.289	0	4 13 20.14	2.0136	N.17 32 17.1	7.148
1	2 40 35.37	1.9442	10 39 3.9	10.237	1	4 15 21.02	2.0157	17 39 23.6	7.069
2	2 42 32.04	1.9449	10 49 16.5	10.183	2	4 17 22.02	2.0178	17 46 25.4	6.991
3	2 44 28.76	1.9457	10 59 25.9	10.129	3	4 19 23.15	2.0199	17 53 22.5	6.912
4	2 46 25.52	1.9464	11 9 32.0	10.075	4	4 21 24.41	2.0220	18 0 14.8	6.832
5	2 48 22.33	1.9472	11 19 34.9	10.021	5	4 23 25.79	2.0241	18 7 2.3	6.751
6	2 50 19.19	1.9481	11 29 34.5	9.966	6	4 25 27.30	2.0263	18 13 44.9	6.670
7	2 52 16.10	1.9490	11 39 30.8	9.910	7	4 27 28.94	2.0285	18 20 22.7	6.589
8	2 54 13.07	1.9500	11 49 23.7	9.854	8	4 29 30.72	2.0307	18 26 55.6	6.507
9	2 56 10.10	1.9509	11 59 13.2	9.797	9	4 31 32.63	2.0329	18 33 23.5	6.424
10	2 58 7.18	1.9519	12 8 59.3	9.739	10	4 33 34.67	2.0351	18 39 46.5	6.341
11	3 0 4.33	1.9530	12 18 41.9	9.681	11	4 35 36.84	2.0373	18 46 4.5	6.257
12	3 2 1.54	1.9541	12 28 21.0	9.622	12	4 37 39.15	2.0396	18 52 17.4	6.173
13	3 3 58.82	1.9552	12 37 56.6	9.563	13	4 39 41.59	2.0418	18 58 25.3	6.089
14	3 5 56.16	1.9563	12 47 28.6	9.503	14	4 41 44.17	2.0441	19 4 28.1	6.005
15	3 7 53.57	1.9575	12 56 57.0	9.443	15	4 43 46.88	2.0463	19 10 25.9	5.920
16	3 9 51.06	1.9587	13 6 21.7	9.382	16	4 45 49.73	2.0486	19 16 18.5	5.834
17	3 11 48.62	1.9600	13 15 42.8	9.321	17	4 47 52.71	2.0508	19 22 6.0	5.748
18	3 13 46.26	1.9613	13 25 0.2	9.258	18	4 49 55.83	2.0531	19 27 48.3	5.661
19	3 15 43.98	1.9627	13 34 13.8	9.195	19	4 51 59.09	2.0554	19 33 25.4	5.574
20	3 17 41.78	1.9640	13 43 23.6	9.132	20	4 54 2.48	2.0577	19 38 57.2	5.486
21	3 19 39.66	1.9654	13 52 29.6	9.068	21	4 56 6.01	2.0600	19 44 23.8	5.398
22	3 21 37.63	1.9668	14 1 31.8	9.005	22	4 58 9.68	2.0622	19 49 45.0	5.309
23	3 23 35.68	1.9682	14 10 30.2	8.941	23	5 0 13.48	2.0645	19 55 0.9	5.221
24	3 25 33.82	1.9697	N.14 19 24.7	8.875	24	5 2 17.42	2.0668	N.20 0 11.5	5.132

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SATURDAY 9.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	5 2 17.42	2.0668	N.20 0 11.5	5.132
1	5 4 21.50	2.0691	20 5 16.7	5.041
2	5 6 25.72	2.0714	20 10 16.4	4.950
3	5 8 30.07	2.0737	20 15 10.7	4.860
4	5 10 34.56	2.0760	20 19 59.6	4.769
5	5 12 39.19	2.0783	20 24 43.0	4.677
6	5 14 43.96	2.0806	20 29 20.8	4.584
7	5 16 48.86	2.0829	20 33 53.1	4.491
8	5 18 53.90	2.0852	20 38 19.8	4.398
9	5 20 59.08	2.0874	20 42 40.9	4.305
10	5 23 4.39	2.0896	20 46 56.4	4.212
11	5 25 9.83	2.0918	20 51 6.3	4.117
12	5 27 15.41	2.0941	20 55 10.5	4.022
13	5 29 21.12	2.0963	20 59 9.0	3.927
14	5 31 26.97	2.0986	21 3 1.7	3.831
15	5 33 32.95	2.1008	21 6 48.7	3.735
16	5 35 39.06	2.1030	21 10 29.9	3.638
17	5 37 45.31	2.1052	21 14 5.3	3.541
18	5 39 51.69	2.1074	21 17 34.9	3.444
19	5 41 58.20	2.1096	21 20 58.6	3.346
20	5 44 4.84	2.1117	21 24 16.4	3.248
21	5 46 11.60	2.1138	21 27 28.4	3.150
22	5 48 18.49	2.1159	21 30 34.4	3.051
23	5 50 25.51	2.1181	N.21 33 34.5	2.952

SUNDAY 10.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	5 52 32.66	2.1202	N.21 36 28.6	2.852
1	5 54 39.93	2.1222	21 39 16.7	2.752
2	5 56 47.32	2.1242	21 41 58.8	2.652
3	5 58 54.84	2.1263	21 44 34.9	2.551
4	6 1 2.48	2.1283	21 47 4.9	2.449
5	6 3 10.24	2.1303	21 49 28.8	2.348
6	6 5 18.12	2.1322	21 51 46.7	2.246
7	6 7 26.11	2.1342	21 53 58.4	2.144
8	6 9 34.22	2.1362	21 56 4.0	2.041
9	6 11 42.45	2.1381	21 58 3.4	1.938
10	6 13 50.79	2.1399	21 59 56.6	1.835
11	6 15 59.24	2.1418	22 1 43.6	1.732
12	6 18 7.81	2.1437	22 3 24.4	1.628
13	6 20 16.49	2.1455	22 4 59.0	1.524
14	6 22 25.27	2.1472	22 6 27.3	1.419
15	6 24 34.16	2.1490	22 7 49.3	1.314
16	6 26 43.15	2.1507	22 9 5.0	1.209
17	6 28 52.25	2.1525	22 10 14.4	1.104
18	6 31 1.45	2.1542	22 11 17.5	0.998
19	6 33 10.75	2.1558	22 12 14.2	0.892
20	6 35 20.15	2.1574	22 13 4.6	0.786
21	6 37 29.64	2.1590	22 13 48.6	0.680
22	6 39 39.23	2.1606	22 14 26.2	0.573
23	6 41 48.91	2.1622	22 14 57.4	0.466
24	6 43 58.69	2.1638	N.22 15 22.1	0.358

MONDAY 11.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	6 43 58.69	2.1638	N.22 15 22.1	0.358
1	6 46 8.56	2.1652	22 15 40.4	0.251
2	6 48 18.51	2.1665	22 15 52.2	0.143
3	6 50 28.54	2.1679	22 15 57.6	+ 0.036
4	6 52 38.66	2.1693	22 15 56.5	− 0.072
5	6 54 48.86	2.1707	22 15 48.9	0.180
6	6 56 59.15	2.1721	22 15 34.9	0.288
7	6 59 9.51	2.1734	22 15 14.3	0.397
8	7 1 19.95	2.1746	22 14 47.2	0.507
9	7 3 30.46	2.1759	22 14 13.5	0.616
10	7 5 41.05	2.1771	22 13 33.3	0.725
11	7 7 51.71	2.1782	22 12 46.5	0.834
12	7 10 2.43	2.1792	22 11 53.2	0.943
13	7 12 13.22	2.1803	22 10 53.3	1.053
14	7 14 24.07	2.1814	22 9 46.8	1.163
15	7 16 34.99	2.1825	22 8 33.7	1.273
16	7 18 45.97	2.1834	22 7 14.0	1.383
17	7 20 57.00	2.1843	22 5 47.7	1.493
18	7 23 8.09	2.1853	22 4 14.8	1.603
19	7 25 19.23	2.1862	22 2 35.3	1.713
20	7 27 30.43	2.1871	22 0 49.2	1.824
21	7 29 41.68	2.1879	21 58 56.4	1.935
22	7 31 52.97	2.1886	21 56 57.0	2.045
23	7 34 4.31	2.1893	N.21 54 51.0	2.156

TUESDAY 12.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	7 36 15.69	2.1900	N.21 52 38.3	2.267
1	7 38 27.11	2.1907	21 50 19.0	2.377
2	7 40 38.57	2.1913	21 47 53.0	2.488
3	7 42 50.07	2.1919	21 45 20.4	2.599
4	7 45 1.60	2.1925	21 42 41.1	2.710
5	7 47 13.17	2.1931	21 39 55.2	2.820
6	7 49 24.77	2.1936	21 37 2.7	2.931
7	7 51 36.40	2.1940	21 34 3.5	3.042
8	7 53 48.05	2.1944	21 30 57.7	3.152
9	7 55 59.73	2.1948	21 27 45.3	3.262
10	7 58 11.43	2.1951	21 24 26.2	3.373
11	8 0 23.15	2.1954	21 21 0.5	3.484
12	8 2 34.88	2.1957	21 17 28.1	3.595
13	8 4 46.63	2.1959	21 13 49.1	3.705
14	8 6 58.39	2.1962	21 10 3.5	3.815
15	8 9 10.17	2.1964	21 6 11.3	3.925
16	8 11 21.96	2.1966	21 2 12.5	4.035
17	8 13 33.76	2.1967	20 58 7.1	4.145
18	8 15 45.56	2.1968	20 53 55.1	4.255
19	8 17 57.37	2.1968	20 49 36.5	4.365
20	8 20 9.18	2.1968	20 45 11.3	4.474
21	8 22 20.99	2.1968	20 40 39.6	4.583
22	8 24 32.80	2.1968	20 36 1.3	4.692
23	8 26 44.60	2.1967	20 31 16.5	4.801
24	8 28 56.40	2.1966	N.20 26 25.2	4.909

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	WEDNESDAY 13.					**FRIDAY 15.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	8 28 56.40	2.1966	N.20 26 25.2	4.909	0	10 13 50.18	2.1687	N.14 31 57.1	9.678
1	8 31 8.19	2.1964	20 21 27.4	5.018	1	10 16 0.28	2.1679	14 22 13.9	9.763
2	8 33 19.97	2.1963	20 16 23.1	5.127	2	10 18 10.33	2.1671	14 12 25.6	9.848
3	8 35 31.75	2.1962	20 11 12.2	5.235	3	10 20 20.33	2.1663	14 2 32.2	9.932
4	8 37 43.52	2.1960	20 5 54.9	5.342	4	10 22 30.29	2.1656	13 52 33.8	10.015
5	8 39 55.27	2.1957	20 0 31.1	5.450	5	10 24 40.20	2.1648	13 42 30.4	10.097
6	8 42 7.00	2.1953	19 55 0.9	5.558	6	10 26 50.07	2.1641	13 32 22.1	10.179
7	8 44 18.71	2.1951	19 49 24.2	5.665	7	10 28 59.90	2.1634	13 22 8.9	10.260
8	8 46 30.41	2.1948	19 43 41.1	5.771	8	10 31 9.68	2.1627	13 11 50.9	10.339
9	8 48 42.09	2.1945	19 37 51.7	5.877	9	10 33 19.42	2.1620	13 1 28.2	10.418
10	8 50 53.75	2.1941	19 31 55.9	5.983	10	10 35 29.12	2.1613	12 51 0.7	10.497
11	8 53 5.38	2.1937	19 25 53.7	6.089	11	10 37 38.78	2.1606	12 40 28.5	10.575
12	8 55 16.99	2.1932	19 19 45.2	6.194	12	10 39 48.39	2.1598	12 29 51.7	10.652
13	8 57 28.57	2.1928	19 13 30.4	6.299	13	10 41 57.96	2.1592	12 19 10.3	10.728
14	8 59 40.13	2.1924	19 7 9.3	6.404	14	10 44 7.50	2.1586	12 8 24.4	10.803
15	9 1 51.66	2.1919	19 0 41.9	6.509	15	10 46 17.00	2.1580	11 57 34.0	10.877
16	9 4 3.16	2.1914	18 54 8.2	6.613	16	10 48 26.46	2.1574	11 46 39.2	10.950
17	9 6 14.63	2.1909	18 47 28.3	6.717	17	10 50 35.89	2.1568	11 35 40.0	11.022
18	9 8 26.07	2.1903	18 40 42.2	6.820	18	10 52 45.28	2.1562	11 24 36.5	11.094
19	9 10 37.47	2.1897	18 33 49.9	6.922	19	10 54 54.64	2.1557	11 13 28.7	11.165
20	9 12 48.84	2.1892	18 26 51.5	7.025	20	10 57 3.97	2.1552	11 2 16.7	11.234
21	9 15 0.18	2.1887	18 19 46.9	7.127	21	10 59 13.26	2.1546	10 51 0.6	11.303
22	9 17 11.48	2.1880	18 12 36.2	7.228	22	11 1 22.52	2.1541	10 39 40.4	11.371
23	9 19 22.74	2.1873	N.18 5 19.5	7.329	23	11 3 31.76	2.1537	N.10 28 16.1	11.437
	THURSDAY 14.					**SATURDAY 16.**			
0	9 21 33.96	2.1867	N.17 57 56.7	7.431	0	11 5 40.97	2.1532	N.10 16 47.9	11.502
1	9 23 45.14	2.1860	17 50 27.8	7.531	1	11 7 50.15	2.1528	10 5 15.8	11.567
2	9 25 56.28	2.1854	17 42 53.0	7.630	2	11 9 59.31	2.1524	9 53 39.8	11.632
3	9 28 7.39	2.1847	17 35 12.2	7.729	3	11 12 8.44	2.1520	9 42 0.0	11.695
4	9 30 18.45	2.1840	17 27 25.5	7.828	4	11 14 17.55	2.1517	9 30 16.4	11.757
5	9 32 29.47	2.1832	17 19 32.9	7.926	5	11 16 26.64	2.1514	9 18 29.1	11.818
6	9 34 40.44	2.1825	17 11 34.4	8.023	6	11 18 35.72	2.1511	9 6 38.2	11.878
7	9 36 51.37	2.1818	17 3 30.1	8.120	7	11 20 44.78	2.1508	8 54 43.8	11.937
8	9 39 2.26	2.1811	16 55 20.0	8.217	8	11 22 53.82	2.1506	8 42 45.8	11.995
9	9 41 13.10	2.1803	16 47 4.1	8.313	9	11 25 2.85	2.1503	8 30 44.4	12.052
10	9 43 23.90	2.1796	16 38 42.4	8.409	10	11 27 11.86	2.1502	8 18 39.6	12.107
11	9 45 34.65	2.1788	16 30 15.0	8.504	11	11 29 20.87	2.1501	8 6 31.5	12.162
12	9 47 45.36	2.1781	16 21 41.9	8.598	12	11 31 29.87	2.1499	7 54 20.2	12.215
13	9 49 56.02	2.1773	16 13 3.2	8.692	13	11 33 38.86	2.1498	7 42 5.7	12.268
14	9 52 6.63	2.1765	16 4 18.9	8.784	14	11 35 47.85	2.1497	7 29 48.0	12.320
15	9 54 17.20	2.1757	15 55 29.1	8.876	15	11 37 56.83	2.1497	7 17 27.3	12.370
16	9 56 27.72	2.1749	15 46 33.8	8.968	16	11 40 5.81	2.1497	7 5 3.6	12.419
17	9 58 38.19	2.1742	15 37 33.0	9.059	17	11 42 14.80	2.1498	6 52 37.0	12.467
18	10 0 48.62	2.1734	15 28 26.7	9.150	18	11 44 23.79	2.1498	6 40 7.6	12.514
19	10 2 59.00	2.1726	15 19 15.0	9.239	19	11 46 32.78	2.1499	6 27 35.4	12.560
20	10 5 9.33	2.1718	15 9 58.0	9.328	20	11 48 41.78	2.1501	6 15 0.4	12.606
21	10 7 19.61	2.1710	15 0 35.7	9.416	21	11 50 50.79	2.1502	6 2 22.7	12.650
22	10 9 29.85	2.1702	14 51 8.1	9.504	22	11 52 59.81	2.1504	5 49 42.4	12.692
23	10 11 40.04	2.1694	14 41 35.2	9.592	23	11 55 8.84	2.1507	5 36 59.7	12.733
24	10 13 50.18	2.1687	N.14 31 57.1	9.678	24	11 57 17.89	2.1510	N. 5 24 14.5	12.773

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SUNDAY 17.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	11 57 17.89	2.1510	N. 5 24 14.5	12.773
1	11 59 26.96	2.1513	5 11 26.9	12.812
2	12 1 36.05	2.1517	4 58 37.0	12.850
3	12 3 45.16	2.1521	4 45 44.9	12.886
4	12 5 54.30	2.1525	4 32 50.7	12.922
5	12 8 3.46	2.1529	4 19 54.3	12.957
6	12 10 12.65	2.1534	4 6 55.9	12.990
7	12 12 21.87	2.1540	3 53 55.5	13.022
8	12 14 31.13	2.1546	3 40 53.3	13.052
9	12 16 40.43	2.1552	3 27 49.3	13.081
10	12 18 49.76	2.1559	3 14 43.6	13.109
11	12 20 59.14	2.1567	3 1 36.2	13.137
12	12 23 8.56	2.1574	2 48 27.2	13.163
13	12 25 18.02	2.1582	2 35 16.7	13.187
14	12 27 27.54	2.1591	2 22 4.8	13.210
15	12 29 37.11	2.1600	2 8 51.5	13.232
16	12 31 46.74	2.1609	1 55 37.0	13.252
17	12 33 56.42	2.1618	1 42 21.3	13.272
18	12 36 6.16	2.1628	1 29 4.4	13.290
19	12 38 15.96	2.1639	1 15 46.5	13.307
20	12 40 25.83	2.1650	1 2 27.6	13.323
21	12 42 35.76	2.1661	0 49 7.8	13.337
22	12 44 45.76	2.1673	0 35 47.2	13.349
23	12 46 55.84	2.1686	N. 0 22 25.9	13.361

MONDAY 18.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	12 49 6.00	2.1699	N. 0 9 3.9	13.371
1	12 51 16.23	2.1712	S. 0 4 18.6	13.380
2	12 53 26.54	2.1726	0 17 41.7	13.388
3	12 55 36.94	2.1740	0 31 5.2	13.394
4	12 57 47.42	2.1754	0 44 29.0	13.398
5	12 59 57.99	2.1770	0 57 53.0	13.402
6	13 2 8.66	2.1786	1 11 17.2	13.404
7	13 4 19.42	2.1802	1 24 41.5	13.405
8	13 6 30.28	2.1818	1 38 5.8	13.405
9	13 8 41.23	2.1834	1 51 30.1	13.403
10	13 10 52.29	2.1851	2 4 54.2	13.400
11	13 13 3.45	2.1869	2 18 18.1	13.395
12	13 15 14.72	2.1888	2 31 41.6	13.389
13	13 17 26.10	2.1907	2 45 4.7	13.382
14	13 19 37.60	2.1926	2 58 27.4	13.373
15	13 21 49.21	2.1945	3 11 49.5	13.362
16	13 24 0.94	2.1965	3 25 10.9	13.351
17	13 26 12.79	2.1986	3 38 31.6	13.338
18	13 28 24.77	2.2007	3 51 51.5	13.324
19	13 30 36.87	2.2028	4 5 10.5	13.308
20	13 32 49.10	2.2049	4 18 28.5	13.291
21	13 35 1.46	2.2072	4 31 45.4	13.272
22	13 37 13.96	2.2095	4 45 1.2	13.252
23	13 39 26.60	2.2118	4 58 15.7	13.231
24	13 41 39.38	2.2142	S. 5 11 28.9	13.208

TUESDAY 19.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	13 41 39.38	2.2142	S. 5 11 28.9	13.208
1	13 43 52.30	2.2165	5 24 40.7	13.184
2	13 46 5.36	2.2189	5 37 51.0	13.158
3	13 48 18.57	2.2214	5 50 59.7	13.131
4	13 50 31.93	2.2240	6 4 6.7	13.102
5	13 52 45.45	2.2266	6 17 12.0	13.072
6	13 54 59.12	2.2292	6 30 15.4	13.041
7	13 57 12.95	2.2318	6 43 16.9	13.008
8	13 59 26.94	2.2345	6 56 16.4	12.974
9	14 1 41.09	2.2372	7 9 13.8	12.938
10	14 3 55.40	2.2399	7 22 9.0	12.901
11	14 6 9.88	2.2427	7 35 2.0	12.863
12	14 8 24.53	2.2456	7 47 52.6	12.823
13	14 10 39.35	2.2485	8 0 40.8	12.781
14	14 12 54.35	2.2514	8 13 26.4	12.738
15	14 15 9.52	2.2543	8 26 9.4	12.694
16	14 17 24.87	2.2573	8 38 49.7	12.648
17	14 19 40.40	2.2604	8 51 27.2	12.601
18	14 21 56.12	2.2635	9 4 1.8	12.552
19	14 24 12.02	2.2666	9 16 33.5	12.502
20	14 26 28.11	2.2697	9 29 2.1	12.450
21	14 28 44.38	2.2728	9 41 27.5	12.396
22	14 31 0.84	2.2760	9 53 49.8	12.344
23	14 33 17.50	2.2792	S. 10 6 8.8	12.288

WEDNESDAY 20.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	14 35 34.35	2.2825	S. 10 18 24.4	12.231
1	14 37 51.40	2.2858	10 30 36.5	12.172
2	14 40 8.65	2.2891	10 42 45.0	12.112
3	14 42 26.09	2.2924	10 54 49.9	12.050
4	14 44 43.73	2.2958	11 6 51.0	11.987
5	14 47 1.58	2.2992	11 18 48.3	11.923
6	14 49 19.63	2.3026	11 30 41.7	11.857
7	14 51 37.89	2.3060	11 42 31.1	11.789
8	14 53 56.35	2.3094	11 54 16.4	11.721
9	14 56 15.02	2.3129	12 5 57.6	11.651
10	14 58 33.90	2.3164	12 17 34.5	11.579
11	15 0 52.99	2.3200	12 29 7.1	11.507
12	15 3 12.30	2.3236	12 40 35.3	11.433
13	15 5 31.82	2.3271	12 51 59.0	11.357
14	15 7 51.55	2.3306	13 3 18.1	11.279
15	15 10 11.49	2.3342	13 14 32.5	11.201
16	15 12 31.65	2.3377	13 25 42.2	11.122
17	15 14 52.02	2.3413	13 36 47.1	11.040
18	15 17 12.61	2.3450	13 47 47.0	10.957
19	15 19 33.42	2.3487	13 58 41.9	10.873
20	15 21 54.45	2.3523	14 9 31.8	10.788
21	15 24 15.70	2.3559	14 20 16.5	10.702
22	15 26 37.16	2.3595	14 30 56.0	10.614
23	15 28 58.84	2.3632	14 41 30.2	10.524
24	15 31 20.74	2.3668	S. 14 51 58.9	10.433

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	THURSDAY 21.					**SATURDAY 23.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	15 31 20.74	2.3668	S. 14 51 58.9	10.433	0	17 28 49.90	2.5137	S. 21 5 30.8	4.733
1	15 33 42.86	2.3705	15 2 22.1	10.341	1	17 31 20.78	2.5156	21 10 10.6	4.593
2	15 36 5.20	2.3742	15 12 39.8	10.248	2	17 33 51.77	2.5174	21 14 41.9	4.452
3	15 38 27.76	2.3778	15 22 51.9	10.153	3	17 36 22.87	2.5191	21 19 4.8	4.310
4	15 40 50.54	2.3815	15 32 58.2	10.058	4	17 38 54.06	2.5206	21 23 19.1	4.167
5	15 43 13.54	2.3851	15 42 58.8	9.961	5	17 41 25.34	2.5220	21 27 24.9	4.025
6	15 45 36,75	2.3887	15 52 53.5	9.862	6	17 43 56.70	2.5233	21 31 22.1	3.882
7	15 48 0.18	2.3923	16 2 42.3	9.762	7	17 46 28.14	2.5247	21 35 10.7	3.738
8	15 50 23.83	2.3960	16 12 25.0	9.661	8	17 48 59.66	2.5260	21 38 50.6	3.593
9	15 52 47.70	2.3996	16 22 1.6	9.558	9	17 51 31.26	2.5272	21 42 21.9	3.449
10	15 55 11.78	2.4032	16 31 32.0	9.455	10	17 54 2.92	2.5282	21 45 44.5	3.304
11	15 57 36.08	2.4068	16 40 56.2	9.351	11	17 56 34.64	2.5292	21 48 58.4	3.158
12	16 0 0.60	2.4104	16 50 14.1	9.244	12	17 59 6.42	2.5301	21 52 3.5	3.013
13	16 2 25.33	2.4139	16 59 25.5	9.137	13	18 1 38.25	2.5308	21 54 59.9	2.867
14	16 4 50.27	2.4174	17 8 30.5	9.029	14	18 4 10.12	2.5315	21 57 47.5	2.720
15	16 7 15.42	2.4209	17 17 29.0	8.920	15	18 6 42.03	2.5322	22 0 26.3	2.573
16	16 9 40.78	2.4244	17 26 20.9	8.809	16	18 9 13.98	2.5327	22 2 56.3	2.427
17	16 12 6.35	2.4278	17 35 6.1	8.697	17	18 11 45.96	2.5332	22 5 17.5	2.280
18	16 14 32.12	2.4312	17 43 44.5	8.583	18	18 14 17.96	2.5335	22 7 29.9	2.132
19	16 16 58.10	2.4347	17 52 16.1	8.469	19	18 16 49.98	2.5337	22 9 33.4	1.985
20	16 19 24.28	2.4381	18 0 40.8	8.353	20	18 19 22.01	2.5339	22 11 28.1	1.837
21	16 21 50.67	2.4415	18 8 58.5	8.237	21	18 21 54.05	2.5340	22 13 13.9	1.689
22	16 24 17.26	2.4448	18 17 9.2	8.120	22	18 24 26.09	2.5339	22 14 50.8	1.542
23	16 26 44.04	2.4480	S. 18 25 12.9	8.002	23	18 26 58.12	2.5338	S. 22 16 18.9	1.394
	FRIDAY 22.					**SUNDAY 24.**			
0	16 29 11.02	2.4513	S. 18 33 9.5	7.882	0	18 29 30.15	2.5337	S. 22 17 38.1	1.246
1	16 31 38.20	2.4546	18 40 58.8	7.761	1	18 32 2.16	2.5333	22 18 48.4	1.098
2	16 34 5.57	2.4577	18 48 40.8	7.639	2	18 34 34.14	2.5328	22 19 49.8	0.950
3	16 36 33.12	2.4607	18 56 15.5	7.516	3	18 37 6.10	2.5324	22 20 42.4	0.802
4	16 39 0.85	2.4637	19 3 42.8	7.392	4	18 39 38.03	2.5318	22 21 26.1	0.654
5	16 41 28.77	2.4668	19 11 2.6	7.268	5	18 42 9.92	2.5311	22 22 0.9	0.506
6	16 43 56.87	2.4698	19 18 14.9	7.143	6	18 44 41.76	2.5303	22 22 26.8	0.358
7	16 46 25.15	2.4728	19 25 19.7	7.016	7	18 47 13.55	2.5294	22 22 43.8	0.210
8	16 48 53.61	2.4757	19 32 16.8	6.888	8	18 49 45.29	2.5285	22 22 52.0	− 0.063
9	16 51 22.24	2.4786	19 39 6.2	6.759	9	18 52 16.97	2.5274	22 22 51.4	+ 0.084
10	16 53 51.04	2.4813	19 45 47.9	6.630	10	18 54 48.58	2.5262	22 22 42.0	0.231
11	16 56 20.00	2.4840	19 52 21.8	6.499	11	18 57 20.12	2.5250	22 22 23.7	0.378
12	16 58 49.12	2.4867	19 58 47.8	6.368	12	18 59 51.58	2.5237	22 21 56.6	0.525
13	17 1 18.40	2.4893	20 5 5.9	6.236	13	19 2 22.96	2.5222	22 21 20.7	0.671
14	17 3 47.84	2.4919	20 11 16.1	6.104	14	19 4 54.25	2.5207	22 20 36.1	0.817
15	17 6 17.43	2.4944	20 17 18.4	5.971	15	19 7 25.44	2.5190	22 19 42.7	0.963
16	17 8 47.17	2.4968	20 23 12.6	5.835	16	19 9 56.53	2.5173	22 18 40.6	1.109
17	17 11 17.05	2.4991	20 28 58.6	5.699	17	19 12 27.52	2.5155	22 17 29.7	1.254
18	17 13 47.07	2.5014	20 34 36.5	5.563	18	19 14 58.39	2.5137	22 16 10.1	1.398
19	17 16 17.22	2.5037	20 40 6.2	5.427	19	19 17 29.15	2.5117	22 14 41.9	1.543
20	17 18 47.51	2.5059	20 45 27.7	5.290	20	19 19 59.79	2.5096	22 13 5.0	1.687
21	17 21 17.93	2.5080	20 50 41.0	5.152	21	19 22 30.30	2.5074	22 11 19.5	1.830
22	17 23 48.47	2.5100	20 55 46.0	5.013	22	19 25 0.68	2.5052	22 9 25.4	1.973
23	17 26 19.13	2.5119	21 0 42.6	4.873	23	19 27 30.93	2.5029	22 7 22.7	2.116
24	17 28 49.90	2.5137	S. 21 5 30.8	4.733	24	19 30 1.03	2.5004	S. 22 5 11.5	2.258

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	MONDAY 25.					WEDNESDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	19 30 1.03	2.5004	S. 22 5 11.5	2.258	0	21 25 59.00	2.3129	S. 17 47 27.8	8.124
1	19 32 30.98	2.4979	22 2 51.8	2.399	1	21 28 17.63	2.3081	17 39 17.4	8.222
2	19 35 0.78	2.4954	22 0 23.6	2.540	2	21 30 35.97	2.3033	17 31 1.2	8.318
3	19 37 30.43	2.4928	21 57 47.0	2.680	3	21 32 54.03	2.2986	17 22 39.2	8.413
4	19 39 59.92	2.4901	21 55 2.0	2.819	4	21 35 11.80	2.2938	17 14 11.6	8.507
5	19 42 29.24	2.4872	21 52 8.7	2.958	5	21 37 29.29	2.2891	17 5 38.4	8.599
6	19 44 58.38	2.4843	21 49 7.0	3.097	6	21 39 46.49	2.2843	16 56 59.7	8.691
7	19 47 27.35	2.4813	21 45 57.0	3.235	7	21 42 3.40	2.2795	16 48 15.5	8.781
8	19 49 56.14	2.4783	21 42 38.8	3.372	8	21 44 20.03	2.2747	16 39 26.0	8.869
9	19 52 24.75	2.4752	21 39 12.4	3.508	9	21 46 36.37	2.2699	16 30 31.2	8.957
10	19 54 53.17	2.4720	21 35 37.8	3.644	10	21 48 52.42	2.2652	16 21 31.1	9.044
11	19 57 21.39	2.4687	21 31 55.1	3.779	11	21 51 8.19	2.2604	16 12 25.9	9.129
12	19 59 49.41	2.4653	21 28 4.3	3.913	12	21 53 23.67	2.2556	16 3 15.6	9.213
13	20 2 17.23	2.4620	21 24 5.5	4.047	13	21 55 38.86	2.2508	15 54 0.3	9.296
14	20 4 44.85	2.4586	21 19 58.7	4.179	14	21 57 53.77	2.2461	15 44 40.1	9.378
15	20 7 12.26	2.4550	21 15 44.0	4.311	15	22 0 8.40	2.2414	15 35 14.9	9.460
16	20 9 39.45	2.4514	21 11 21.4	4.442	16	22 2 22.74	2.2367	15 25 44.9	9.539
17	20 12 6.43	2.4478	21 6 50.9	4.573	17	22 4 36.80	2.2320	15 16 10.2	9.617
18	20 14 33.19	2.4441	21 2 12.6	4.702	18	22 6 50.58	2.2272	15 6 30.9	9.694
19	20 16 59.72	2.4403	20 57 26.6	4.830	19	22 9 4.07	2.2225	14 56 47.0	9.770
20	20 19 26.03	2.4365	20 52 33.0	4.958	20	22 11 17.28	2.2179	14 46 58.5	9.845
21	20 21 52.10	2.4325	20 47 31.7	5.085	21	22 13 30.22	2.2133	14 37 5.6	9.918
22	20 24 17.93	2.4286	20 42 22.8	5.211	22	22 15 42.88	2.2087	14 27 8.4	9.990
23	20 26 43.53	2.4247	S. 20 37 6.4	5.335	23	22 17 55.26	2.2040	S. 14 17 6.8	10.062
	TUESDAY 26.					THURSDAY 28.			
0	20 29 8.89	2.4206	S. 20 31 42.6	5.458	0	22 20 7.36	2.1994	S. 14 7 1.0	10.131
1	20 31 34.00	2.4165	20 26 11.4	5.582	1	22 22 19.19	2.1949	13 56 51.1	10.199
2	20 33 58.87	2.4124	20 20 32.8	5.705	2	22 24 30.75	2.1903	13 46 37.1	10.267
3	20 36 23.49	2.4082	20 14 46.8	5.827	3	22 26 42.03	2.1857	13 36 19.1	10.333
4	20 38 47.85	2.4039	20 8 53.6	5.946	4	22 28 53.04	2.1813	13 25 57.1	10.398
5	20 41 11.96	2.3997	20 2 53.3	6.064	5	22 31 3.79	2.1769	13 15 31.3	10.462
6	20 43 35.82	2.3955	19 56 45.9	6.182	6	22 33 14.27	2.1725	13 5 1.7	10.524
7	20 45 59.42	2.3911	19 50 31.4	6.300	7	22 35 24.49	2.1681	12 54 28.4	10.586
8	20 48 22.75	2.3867	19 44 9.9	6.416	8	22 37 34.44	2.1636	12 43 51.4	10.647
9	20 50 45.82	2.3822	19 37 41.5	6.530	9	22 39 44.12	2.1592	12 33 10.8	10.706
10	20 53 8.62	2.3777	19 31 6.3	6.644	10	22 41 53.54	2.1549	12 22 26.7	10.763
11	20 55 31.15	2.3733	19 24 24.2	6.757	11	22 44 2.71	2.1507	12 11 39.2	10.820
12	20 57 53.42	2.3689	19 17 35.4	6.869	12	22 46 11.62	2.1464	12 0 48.3	10.876
13	21 0 15.42	2.3643	19 10 39.9	6.980	13	22 48 20.28	2.1421	11 49 54.1	10.930
14	21 2 37.14	2.3597	19 3 37.8	7.089	14	22 50 28.68	2.1379	11 38 56.7	10.982
15	21 4 58.58	2.3551	18 56 29.2	7.198	15	22 52 36.83	2.1338	11 27 56.2	11.034
16	21 7 19.75	2.3505	18 49 14.1	7.306	16	22 54 44.74	2.1297	11 16 52.6	11.086
17	21 9 40.64	2.3458	18 41 52.5	7.413	17	22 56 52.40	2.1256	11 5 45.9	11.137
18	21 12 1.25	2.3412	18 34 24.6	7.518	18	22 58 59.81	2.1215	10 54 36.2	11.185
19	21 14 21.58	2.3365	18 26 50.4	7.622	19	23 1 6.98	2.1175	10 43 23.7	11.232
20	21 16 41.63	2.3318	18 19 10.0	7.724	20	23 3 13.91	2.1135	10 32 8.4	11.278
21	21 19 1.40	2.3271	18 11 23.5	7.826	21	23 5 20.60	2.1096	10 20 50.4	11.323
22	21 21 20.88	2.3224	18 3 30.9	7.927	22	23 7 27.06	2.1057	10 9 29.7	11.367
23	21 23 40.08	2.3177	17 55 32.3	8.026	23	23 9 33.29	2.1019	9 58 6.4	11.409
24	21 25 59.00	2.3129	S. 17 47 27.8	8.124	24	23 11 39.29	2.0981	S. 9 46 40.6	11.431

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

FRIDAY 29.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	23 11 39.29	2.0981	S. 9 46 40.6	11.451
1	23 13 45.06	2.0943	9 35 12.3	11.492
2	23 15 50.60	2.0905	9 23 41.6	11.531
3	23 17 55.92	2.0868	9 12 8.6	11.569
4	23 20 1.02	2.0832	9 0 33.4	11.606
5	23 22 5.90	2.0795	8 48 55.9	11.643
6	23 24 10.56	2.0759	8 37 16.3	11.678
7	23 26 15.01	2.0724	8 25 34.6	11.712
8	23 28 19.25	2.0689	8 13 50.9	11.744
9	23 30 23.28	2.0655	8 2 5.3	11.775
10	23 32 27.11	2.0622	7 50 17.9	11.805
11	23 34 30.74	2.0588	7 38 28.7	11.834
12	23 36 34.17	2.0555	7 26 37.8	11.862
13	23 38 37.40	2.0522	7 14 45.2	11.890
14	23 40 40.44	2.0490	7 2 51.0	11.916
15	23 42 43.28	2.0458	6 50 55.3	11.941
16	23 44 45.93	2.0427	6 38 58.1	11.965
17	23 46 48.40	2.0396	6 26 59.5	11.989
18	23 48 50.68	2.0365	6 14 59.5	12.011
19	23 50 52.78	2.0336	6 2 58.2	12.031
20	23 52 54.71	2.0307	5 50 55.8	12.050
21	23 54 56.46	2.0278	5 38 52.2	12.069
22	23 56 58.04	2.0249	5 26 47.5	12.087
23	23 58 59.45	2.0221	S. 5 14 41.8	12.103

SATURDAY 30.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	0 1 0.69	2.0194	S. 5 2 35.1	12.119
1	0 3 1.77	2.0167	4 50 27.5	12.133
2	0 5 2.69	2.0140	4 38 19.1	12.147
3	0 7 3.45	2.0114	4 26 9.9	12.159
4	0 9 4.06	2.0089	4 14 0.0	12.171
5	0 11 4.52	2.0064	4 1 49.4	12.182
6	0 13 4.82	2.0039	3 49 38.2	12.191
7	0 15 4.98	2.0015	3 37 26.5	12.199
8	0 17 5.00	1.9992	3 25 14.3	12.207
9	0 19 4.88	1.9968	3 13 1.6	12.214
10	0 21 4.62	1.9945	3 0 48.6	12.219
11	0 23 4.22	1.9923	2 48 35.3	12.223
12	0 25 3.69	1.9902	2 36 21.8	12.227
13	0 27 3.04	1.9881	2 24 8.1	12.230
14	0 29 2.26	1.9860	2 11 54.2	12.232
15	0 31 1.36	1.9840	1 59 40.3	12.232
16	0 33 0.34	1.9820	1 47 26.4	12.232
17	0 34 59.20	1.9801	1 35 12.5	12.231
18	0 36 57.95	1.9782	1 22 58.7	12.229
19	0 38 56.59	1.9764	1 10 45.0	12.226
20	0 40 55.12	1.9746	0 58 31.6	12.221
21	0 42 53.54	1.9728	0 46 18.5	12.216
22	0 44 51.86	1.9712	0 34 5.7	12.211
23	0 46 50.09	1.9696	0 21 53.2	12.204
24	0 48 48.22	1.9680	S. 0 9 41.2	12.196

SUNDAY 31.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	′
0	0 48 48.22	1.9680	S. 0 9 41.2	12.196
1	0 50 46.25	1.9664	N. 0 2 30.3	12.187
2	0 52 44.19	1.9650	0 14 41.3	12.178
3	0 54 42.05	1.9637	0 26 51.7	12.167
4	0 56 39.83	1.9623	0 39 1.4	12.156
5	0 58 37.53	1.9610	0 51 10.4	12.144
6	1 0 35.15	1.9597	1 3 18.7	12.132
7	1 2 32.69	1.9584	1 15 26.2	12.118
8	1 4 30.16	1.9572	1 27 32.8	12.102
9	1 6 27.56	1.9561	1 39 38.4	12.086
10	1 8 24.89	1.9549	1 51 43.1	12.070
11	1 10 22.15	1.9538	2 3 46.8	12.052
12	1 12 19.35	1.9529	2 15 49.4	12.034
13	1 14 16.50	1.9520	2 27 50.9	12.015
14	1 16 13.59	1.9511	2 39 51.2	11.995
15	1 18 10.63	1.9502	2 51 50.3	11.975
16	1 20 7.62	1.9494	3 3 48.2	11.953
17	1 22 4.56	1.9486	3 15 44.7	11.930
18	1 24 1.45	1.9478	3 27 39.8	11.907
19	1 25 58.30	1.9472	3 39 33.5	11.883
20	1 27 55.12	1.9467	3 51 25.8	11.858
21	1 29 51.91	1.9461	4 3 16.5	11.832
22	1 31 48.66	1.9455	4 15 5.6	11.805
23	1 33 45.37	1.9449	N. 4 26 53.1	11.778

MONDAY, APRIL 1.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	1 35 42.05	1.9445	N. 4 38 39.0	11.750

PHASES OF THE MOON.

		d	h	m
● New Moon	March	1	10	0.8
☽ First Quarter	. . .	9	5	59.4
○ Full Moon	. . . .	16	23	47.2
☾ Last Quarter	. . . .	23	18	54.4
● New Moon	. . . .	30	23	37.4

		d	h
☾ Apogee. . .	March	8	21.3
☾ Perigee.		21	0.7

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff	IXh.	P. L. of Diff.
3	Sun	W.	20° 4′ 58″	3086	21° 33′ 25″	3089	23° 1′ 48″	3095	24° 30′ 4″	3102
	Aldebaran	E.	65 17 18	2655	63 39 38	2669	62 2 16	2682	60 25 12	2696
	Pollux	E.	109 25 48	2684	107 48 46	2695	106 12 0	2708	104 35 31	2722
4	Sun	W.	31 48 44	3153	33 15 49	3164	34 42 41	3176	36 9 19	3188
	Aldebaran	E.	52 24 25	2763	50 49 9	2777	49 14 11	2790	47 39 30	2803
	Pollux	E.	96 37 27	2787	95 2 42	2800	93 28 14	2813	91 54 3	2825
5	Sun	W.	43 18 51	3249	44 44 2	3261	46 8 59	3273	47 33 42	3284
	Mars	W.	16 34 29	3303	17 58 37	3292	19 22 58	3285	20 47 27	3289
	Aldebaran	E.	39 50 22	2868	38 17 22	2880	36 44 38	2893	35 12 10	2905
	Pollux	E.	84 7 14	2889	82 34 41	2901	81 2 23	2913	79 30 21	2924
	Saturn	E.	106 36 42	2838	105 3 4	2851	103 29 42	2863	101 56 36	2875
6	Sun	W.	54 33 59	3339	55 57 25	3350	57 20 39	3359	58 43 42	3369
	Mars	W.	27 50 2	3293	29 14 22	3298	30 38 36	3303	32 2 44	3308
	Aldebaran	E.	27 33 40	2964	26 2 42	2976	24 31 59	2987	23 1 30	2998
	Pollux	E.	71 53 47	2981	70 23 10	2991	68 52 46	3001	67 22 34	3010
	Saturn	E.	94 14 39	2928	92 42 56	2938	91 11 25	2947	89 40 6	2956
7	Sun	W.	65 36 20	3411	66 58 24	3418	68 20 20	3424	69 42 9	3431
	Mars	W.	39 1 46	3337	40 25 15	3343	41 48 37	3347	43 11 54	3351
	α Arietis	W.	21 47 41	4335	22 54 1	4184	24 2 42	4062	25 13 21	3959
	Venus	W.	21 37 52	3684	22 54 56	3654	24 12 32	3629	25 30 35	3608
	Pollux	E.	59 54 30	3056	58 25 26	3063	56 56 31	3071	55 27 46	3078
	Saturn	E.	82 6 13	2997	80 35 56	3003	79 5 47	3009	77 35 46	3015
	Regulus	E.	95 37 47	3023	94 8 3	3030	92 38 27	3036	91 8 59	3042
8	Sun	W.	76 29 35	3455	77 50 49	3459	79 11 59	3462	80 33 6	3463
	Mars	W.	50 7 7	3370	51 29 58	3372	52 52 46	3374	54 15 32	3376
	Venus	W.	32 5 28	3543	33 25 5	3534	34 44 52	3525	36 4 48	3519
	α Arietis	W.	31 27 49	3634	32 45 47	3593	34 4 29	3556	35 23 51	3525
	Pollux	E.	48 6 8	3110	46 38 11	3116	45 10 21	3122	43 42 38	3127
	Saturn	E.	70 7 20	3039	68 37 55	3042	67 8 34	3044	65 39 16	3047
	Regulus	E.	83 43 16	3065	82 14 23	3068	80 45 34	3071	79 16 49	3073
9	Sun	W.	87 18 14	3468	88 39 14	3467	90 0 15	3465	91 21 18	3463
	Mars	W.	61 9 5	3377	62 31 48	3375	63 54 33	3373	65 17 20	3372
	Venus	W.	42 46 17	3488	44 6 55	3481	45 27 40	3474	46 48 33	3467
	α Arietis	W.	42 8 31	3404	43 30 43	3386	44 53 16	3368	46 16 9	3352
	Saturn	E.	58 13 16	3050	56 44 5	3050	55 14 54	3049	53 45 42	3047
	Regulus	E.	71 53 31	3077	70 24 53	3076	68 56 14	3075	67 27 34	3073
10	Sun	W.	98 7 15	3446	99 28 39	3441	100 50 9	3436	102 11 45	3430
	Mars	W.	72 12 5	3352	73 35 16	3347	74 58 33	3341	76 21 57	3335
	Venus	W.	53 34 52	3431	54 56 33	3424	56 18 22	3416	57 40 20	3408
	α Arietis	W.	53 14 56	3282	54 39 29	3268	56 4 18	3255	57 29 22	3242
	Saturn	E.	46 18 57	3031	44 49 23	3026	43 19 43	3022	41 49 57	3017
	Regulus	E.	60 3 31	3058	58 34 30	3053	57 5 23	3048	55 36 10	3043
11	Sun	W.	109 1 36	3393	110 24 0	3385	111 46 34	3375	113 9 19	3365
	α Arietis	W.	64 38 24	3181	66 4 56	3168	67 31 44	3155	68 58 47	3143

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
3	**Sun**	W.	25° 58′ 11″	3111	27° 26′ 7″	3190	28° 53′ 52″	3130	30° 21′ 25″	3142
	Aldebaran	E.	58 48 27	2709	57 11 59	2723	55 35 50	2737	53 59 59	2750
	Pollux	E.	102 59 20	2735	101 23 26	2747	99 47 49	2760	98 12 29	2774
4	**Sun**	W.	37 35 42	3200	39 1 51	3213	40 27 45	3225	41 53 25	3237
	Aldebaran	E.	46 5 6	2817	44 31 0	2830	42 57 11	2842	41 23 38	2855
	Pollux	E.	90 20 8	2838	88 46 30	2851	87 13 8	2864	85 40 3	2876
5	**Sun**	W.	48 58 12	3296	50 22 28	3307	51 46 31	3319	53 10 21	3329
	Mars	W.	22 12 0	3281	23 36 34	3282	25 1 7	3284	26 25 37	3288
	Aldebaran	E.	33 39 58	2917	32 8 1	2929	30 36 19	2941	29 4 52	2953
	Pollux	E.	77 58 33	2936	76 27 0	2948	74 55 42	2959	73 24 38	2969
	Saturn	E.	100 23 45	2886	98 51 8	2897	97 18 45	2907	95 46 35	2918
6	**Sun**	W.	60 6 34	3379	61 29 15	3387	62 51 46	3396	64 14 7	3403
	Mars	W.	33 26 46	3314	34 50 41	3320	36 14 29	3325	37 38 11	3332
	Aldebaran	E.	21 31 15	3010	20 1 15	3022	18 31 30	3035	17 2 1	3048
	Pollux	E.	65 52 34	3020	64 22 46	3030	62 53 10	3039	61 23 45	3047
	Saturn	E.	88 8 58	2965	86 38 1	2973	85 7 15	2981	83 36 39	2989
7	**Sun**	W.	71 3 50	3437	72 25 25	3442	73 46 54	3447	75 8 17	3452
	Mars	W.	44 35 6	3356	45 58 13	3360	47 21 15	3364	48 44 13	3367
	α Arietis	W.	26 25 41	3872	27 39 29	3798	28 54 33	3736	30 10 42	3681
	Venus	W.	26 49 1	3590	28 7 46	3576	29 26 47	3563	30 46 2	3553
	Pollux	E.	53 59 10	3085	52 30 42	3092	51 2 23	3099	49 34 12	3105
	Saturn	E.	76 5 52	3021	74 36 5	3026	73 6 25	3030	71 36 50	3034
	Regulus	E.	89 39 38	3047	88 10 23	3052	86 41 15	3057	85 12 13	3061
8	**Sun**	W.	81 54 11	3465	83 15 14	3467	84 36 15	3468	85 57 15	3469
	Mars	W.	55 38 16	3377	57 0 59	3378	58 23 41	3378	59 46 23	3378
	Venus	W.	37 24 51	3512	38 45 2	3506	40 5 20	3499	41 25 45	3493
	α Arietis	W.	36 43 48	3496	38 4 17	3469	39 25 16	3446	40 46 41	3423
	Pollux	E.	42 15 1	3132	40 47 30	3138	39 20 6	3143	37 52 48	3148
	Saturn	E.	64 10 1	3049	62 40 49	3050	61 11 38	3050	59 42 27	3050
	Regulus	E.	77 48 7	3074	76 19 26	3076	74 50 47	3077	73 22 9	3077
9	**Sun**	W.	92 42 23	3462	94 3 30	3458	95 24 41	3454	96 45 56	3451
	Mars	W.	66 40 9	3369	68 3 1	3365	69 25 58	3361	70 48 59	3357
	Venus	W.	48 9 34	3461	49 30 42	3454	50 51 57	3447	52 13 20	3439
	α Arietis	W.	47 39 20	3337	49 2 49	3322	50 26 35	3307	51 50 38	3294
	Saturn	E.	52 16 28	3045	50 47 11	3042	49 17 50	3039	47 48 26	3035
	Regulus	E.	65 58 52	3071	64 30 7	3069	63 1 19	3065	61 32 27	3062
10	**Sun**	W.	103 33 27	3423	104 55 17	3416	106 17 15	3409	107 39 21	3401
	Mars	W.	77 45 28	3328	79 9 7	3321	80 32 54	3313	81 56 50	3306
	Venus	W.	59 2 28	3398	60 24 47	3389	61 47 16	3379	63 9 56	3369
	α Arietis	W.	58 54 41	3230	60 20 15	3217	61 46 4	3205	63 12 7	3193
	Saturn	E.	40 20 5	3010	38 50 5	3004	37 19 57	2997	35 49 41	2990
	Regulus	E.	54 6 51	3037	52 37 24	3031	51 7 50	3025	49 38 8	3018
11	**Sun**	W.	114 32 16	3355	115 55 24	3345	117 18 43	3334	118 42 15	3324
	α Arietis	W.	70 26 5	3130	71 53 38	3117	73 21 27	3105	74 49 31	3091

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
11	Venus	W.	64° 32′ 48″	3358	65° 55′ 52″	3348	67° 19′ 8″	3338	68° 42′ 36″	3326
	Aldebaran	W.	32 12 51	3010	33 42 51	3001	35 13 2	2992	36 43 25	2983
	Regulus	E.	48 8 17	3009	46 38 16	3001	45 8 5	2994	43 37 45	2985
	Spica	E.	102 5 23	3035	100 35 54	3027	99 6 15	3018	97 36 25	3009
12	Sun	W.	120 5 59	3313	121 29 56	3300	122 54 7	3288	124 18 33	3276
	α Arietis	W.	76 17 51	3078	77 46 27	3065	79 15 19	3052	80 44 27	3039
	Venus	W.	75 43 24	3265	77 8 17	3251	78 33 26	3237	79 58 51	3224
	Aldebaran	W.	44 18 28	2929	45 50 10	2917	47 22 7	2905	48 54 19	2894
	Regulus	E.	35 3 14	2938	34 31 43	2928	33 0 0	2918	31 28 4	2908
	Spica	E.	90 4 10	2957	88 33 3	2946	87 1 42	2934	85 30 6	2923
13	α Arietis	W.	88 14 17	2971	89 45 6	2958	91 16 11	2945	92 47 33	2931
	Venus	W.	87 10 4	3153	88 37 40	3137	90 4 35	3122	91 32 18	3107
	Aldebaran	W.	56 39 18	2829	58 13 8	2815	59 47 16	2801	61 21 42	2788
	Spica	E.	77 48 18	2860	76 15 8	2847	74 41 41	2834	73 7 57	2821
14	Aldebaran	W.	69 18 29	2716	70 54 47	2701	72 31 25	2687	74 8 22	2672
	Pollux	W.	25 46 4	2854	27 19 22	2825	28 53 18	2798	30 27 49	2772
	Spica	E.	65 15 0	2754	63 39 32	2741	62 3 46	2727	60 27 42	2714
	Antares	E.	111 8 49	2760	109 33 28	2744	107 57 47	2729	106 21 46	2713
15	Aldebaran	W.	82 18 3	2600	83 56 58	2585	85 36 13	2571	87 15 48	2557
	Pollux	W.	38 28 4	2666	40 5 30	2647	41 43 21	2629	43 21 37	2610
	Saturn	W.	16 4 40	2587	17 43 53	2572	19 23 26	2557	21 3 20	2543
	Spica	E.	52 23 7	2652	50 45 22	2640	49 7 21	2628	47 29 4	2618
	Antares	E.	98 16 34	2638	96 38 31	2624	95 0 8	2610	93 21 26	2595
16	Aldebarar	W.	95 38 28	2489	97 19 57	2476	99 1 44	2463	100 43 49	2451
	Pollux	W.	51 38 49	2529	53 19 22	2515	55 0 15	2500	56 41 28	2486
	Saturn	W.	29 27 48	2472	31 9 40	2460	32 51 50	2447	34 34 18	2434
	Regulus	W.	15 38 51	2549	17 18 56	2525	18 59 35	2504	20 40 43	2485
	Spica	E.	39 14 18	2574	37 34 47	2567	35 55 7	2562	34 15 20	2559
	Antares	E.	85 3 7	2527	83 22 32	2515	81 41 39	2502	80 0 29	2489
17	Pollux	W.	65 12 19	2422	66 55 23	2410	68 38 43	2399	70 22 19	2389
	Saturn	W.	43 10 59	2376	44 55 8	2365	46 39 33	2355	48 24 13	2344
	Regulus	W.	29 12 23	2410	30 55 44	2397	32 39 23	2384	34 23 20	2373
	Antares	E.	71 30 31	2435	69 47 46	2425	68 4 47	2416	66 21 35	2408
	Jupiter	E.	98 46 4	2425	97 3 5	2414	95 19 50	2403	93 36 20	2393
18	Pollux	W.	79 3 57	2342	80 48 56	2333	82 34 7	2326	84 19 29	2318
	Saturn	W.	57 11 1	2300	58 57 0	2292	60 43 11	2285	62 29 32	2279
	Regulus	W.	43 6 56	2324	44 52 20	2315	46 37 57	2308	48 23 45	2300
	Antares	E.	57 42 43	2371	55 58 27	2366	54 14 4	2362	52 29 34	2357
	Jupiter	E.	84 55 19	2348	83 10 29	2339	81 25 27	2332	79 40 14	2325
	α Aquilæ	E.	103 52 47	2968	102 22 19	2970	100 51 29	2955	99 20 20	2942
19	Saturn	W.	71 23 38	2250	73 10 51	2245	74 58 11	2241	76 45 37	2238
	Regulus	W.	57 15 18	2270	59 2 2	2265	60 48 53	2261	62 35 50	2257
	Antares	E.	43 46 2	2351	42 1 17	2353	40 16 34	2355	38 31 55	2359
	Jupiter	E.	70 51 47	2296	69 5 41	2291	67 19 28	2287	65 33 9	2283

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
11	Venus	W.	70° 6′ 17″	3314	71° 30′ 12″	3301	72° 54′ 22″	3289	74° 18′ 46″	3277
	Aldebaran	W.	38 13 59	2973	39 44 46	2962	41 15 46	2951	42 47 0	2940
	Regulus	E.	42 7 14	2977	40 36 32	2967	39 5 38	2958	37 34 32	2948
	Spica	E.	96 6 23	2999	94 36 9	2989	93 5 42	2979	91 35 3	2968
12	Sun	W.	125 43 13	3264	127 8 7	3251	128 33 16	3238	129 58 40	3225
	α Arietis	W.	82 13 52	3025	83 43 34	3012	85 13 32	2999	86 43 46	2985
	Venus	W.	81 24 32	3209	82 50 30	3195	84 16 45	3182	85 43 16	3168
	Aldebaran	W.	50 26 46	2881	51 59 29	2868	53 32 29	2855	55 5 45	2842
	Regulus	E.	29 55 55	2898	28 23 33	2887	26 50 57	2876	25 18 8	2866
	Spica	E.	83 58 16	2910	82 26 10	2898	80 53 49	2886	79 21 12	2873
13	α Arietis	W.	94 19 12	2918	95 51 8	2905	97 23 21	2891	98 55 51	2879
	Venus	W.	93 0 19	3092	94 28 38	3077	95 57 16	3061	97 26 13	3046
	Aldebaran	W.	62 56 26	2773	64 31 29	2760	66 6 50	2745	67 42 30	2731
	Spica	E.	71 33 57	2808	69 59 39	2795	68 25 4	2781	66 50 11	2767
14	Aldebaran	W.	75 45 39	2657	77 23 16	2643	79 1 12	2629	80 39 28	2615
	Pollux	W.	32 2 53	2749	33 38 28	2727	35 14 32	2706	36 51 4	2685
	Spica	E.	58 51 21	2701	57 14 43	2689	55 37 48	2676	54 0 36	2663
	Antares	E.	104 45 24	2698	103 8 42	2684	101 31 40	2668	99 54 17	2653
15	Aldebaran	W.	88 55 42	2543	90 35 55	2530	92 16 27	2516	93 57 18	2502
	Pollux	W.	45 0 18	2593	46 39 22	2577	48 18 49	2561	49 58 38	2545
	Saturn	W.	22 43 34	2528	24 24 8	2514	26 5 2	2500	27 46 15	2486
	Spica	E.	45 50 33	2608	44 11 49	2598	42 32 51	2588	40 53 40	2580
	Antares	E.	91 42 24	2581	90 3 3	2567	88 23 23	2553	86 43 24	2540
16	Aldebaran	W.	102 26 11	2438	104 8 51	2427	105 51 47	2415	107 35 0	2404
	Pollux	W.	58 23 1	2472	60 4 53	2459	61 47 4	2446	63 29 33	2434
	Saturn	W.	36 17 4	2422	38 0 8	2410	39 43 29	2398	41 27 6	2387
	Regulus	W.	22 22 18	2467	24 4 17	2451	25 46 39	2437	27 29 21	2423
	Spica	E.	32 35 29	2558	30 55 36	2558	29 15 43	2561	27 35 54	2567
	Antares	E.	78 19 1	2477	76 37 16	2467	74 55 16	2456	73 13 1	2445
17	Pollux	W.	72 6 10	2378	73 50 16	2368	75 34 36	2359	77 19 10	2350
	Saturn	W.	50 9 8	2335	51 54 17	2326	53 39 39	2317	55 25 14	2309
	Regulus	W.	36 7 34	2362	37 52 3	2352	39 36 47	2342	41 21 45	2333
	Antares	E.	64 38 11	2399	62 54 35	2391	61 10 48	2384	59 26 50	2378
	Jupiter	E.	91 52 35	2383	90 8 36	2373	88 24 23	2364	86 39 57	2356
18	Pollux	W.	86 5 2	2312	87 50 44	2306	89 36 35	2300	91 22 35	2295
	Saturn	W.	64 16 3	2272	66 2 44	2266	67 49 34	2260	69 36 32	2255
	Regulus	W.	50 9 45	2293	51 55 55	2287	53 42 14	2281	55 28 42	2275
	Antares	E.	50 44 58	2354	49 0 17	2352	47 15 33	2351	45 30 48	2350
	Jupiter	E.	77 54 51	2319	76 9 19	2312	74 23 37	2306	72 37 46	2300
	α Aquilæ	E.	97 48 54	2930	96 17 13	2920	94 45 19	2911	93 13 14	2903
19	Saturn	W.	78 33 8	2235	80 20 44	2231	82 8 25	2229	83 56 10	2227
	Regulus	W.	64 22 53	2253	66 10 2	2250	67 57 15	2247	69 44 32	2245
	Antares	E.	36 47 22	2366	35 2 58	2374	33 18 46	2384	31 34 49	2398
	Jupiter	E.	63 46 44	2279	62 0 14	2276	60 13 39	2274	58 27 1	2271

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
19	α Aquilæ	E.	91° 40′ 59″	2897	90° 8′ 36″	2892	88° 36′ 7″	2890	87° 3′ 35″	2888
20	Regulus	W.	71 31 53	2243	73 19 17	2241	75 6 43	2241	76 54 10	2240
	Spica	W.	18 44 12	2553	20 24 11	2503	22 5 20	2463	23 47 25	2432
	Jupiter	E.	56 40 19	2269	54 53 34	2268	53 6 47	2267	51 19 59	2266
	α Aquilæ	E.	79 21 1	2902	77 48 45	2910	76 16 39	2920	74 44 45	2931
21	Regulus	W.	85 51 36	2241	87 39 3	2241	89 26 29	2243	91 13 53	2245
	Spica	W.	32 26 21	2348	34 11 11	2339	35 56 14	2332	37 41 27	2326
	Jupiter	E.	42 25 47	2266	40 38 58	2268	38 52 11	2269	37 5 26	2271
	α Aquilæ	E.	67 9 34	3016	65 39 41	3039	64 10 17	3066	62 41 26	3096
	Fomalhaut	E.	99 2 8	2447	97 19 40	2446	95 37 11	2447	93 54 43	2448
	Sun	E.	126 47 59	2570	125 8 23	2571	123 28 48	2572	121 49 14	2572
22	Regulus	W.	100 10 5	2257	101 57 8	2260	103 44 6	2264	105 30 59	2267
	Spica	W.	46 29 4	2313	48 14 44	2313	50 0 24	2313	51 46 4	2315
	α Aquilæ	E.	55 27 17	3291	54 2 55	3343	52 39 33	3400	51 17 17	3463
	Fomalhaut	E.	85 22 57	2461	83 40 49	2465	81 58 47	2470	80 16 52	2476
	Sun	E.	113 31 55	2583	111 52 37	2586	110 13 23	2589	108 34 13	2592
23	Spica	W.	60 33 50	2325	62 19 13	2328	64 4 32	2331	65 49 46	2335
	Fomalhaut	E.	71 49 38	2515	70 8 45	2525	68 28 6	2535	66 47 41	2546
	α Pegasi	E.	88 31 51	2673	86 54 35	2678	85 17 26	2685	83 40 26	2692
	Sun	E.	100 19 39	2613	98 41 2	2618	97 2 31	2623	95 24 7	2627
24	Spica	W.	74 34 30	2356	76 19 8	2361	78 3 39	2366	79 48 3	2371
	Antares	W.	29 6 55	2487	30 48 27	2475	32 30 15	2467	34 12 15	2461
	Fomalhaut	E.	58 29 55	2616	56 51 22	2634	55 13 13	2652	53 35 29	2673
	α Pegasi	E.	75 38 17	2743	74 2 34	2755	72 27 7	2769	70 51 59	2784
	Sun	E.	87 13 51	2655	85 36 10	2660	83 58 37	2666	82 21 12	2672
25	Spica	W.	88 28 8	2398	90 11 45	2404	91 55 14	2410	93 38 34	2417
	Antares	W.	42 43 41	2450	44 26 4	2451	46 8 26	2453	47 50 46	2455
	Fomalhaut	E.	45 34 29	2805	44 0 8	2839	42 26 31	2877	40 53 43	2920
	α Pegasi	E.	63 1 40	2877	61 28 52	2900	59 56 33	2925	58 24 46	2952
	Sun	E.	74 16 11	2704	72 39 37	2710	71 3 11	2717	69 26 54	2725
26	Antares	W.	56 21 30	2471	58 3 24	2475	59 45 12	2480	61 26 53	2485
	Jupiter	W.	27 40 59	2443	29 23 32	2449	31 5 57	2455	32 48 13	2462
	Fomalhaut	E.	33 25 25	3226	31 59 47	3314	30 35 52	3417	29 13 55	3537
	α Pegasi	E.	50 55 14	3124	49 27 33	3168	48 0 45	3215	46 34 54	3269
	Sun	E.	61 27 53	2760	59 52 33	2769	58 17 24	2776	56 42 25	2784
27	Antares	W.	69 53 29	2513	71 34 24	2519	73 15 11	2525	74 55 49	2532
	Jupiter	W.	41 17 11	2496	42 58 30	2502	44 39 40	2510	46 20 40	2517
	α Aquilæ	W.	36 13 36	5166	37 8 23	4959	38 5 51	4777	39 5 46	4617
	Sun	E.	48 50 10	2827	47 16 17	2836	45 42 36	2845	44 9 7	2855
28	Antares	W.	83 16 38	2567	84 56 18	2575	86 35 47	2583	88 15 6	2591
	Jupiter	W.	54 43 7	2554	56 23 5	2562	58 2 52	2570	59 42 28	2577
	α Aquilæ	W.	44 35 28	4052	45 46 16	3975	46 58 20	3906	48 11 34	3844
	Sun	E.	36 24 58	2909	34 52 51	2922	33 21 0	2935	31 49 25	2949

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
19	α Aquilæ	E.	85° 31′ 1″	2887	83° 58′ 26″	2889	82° 25′ 53″	2892	80° 53′ 24″	2897
20	Regulus	W.	78 41 38	2239	80 29 7	2239	82 16 37	2239	84 4 7	2239
	Spica	W.	25 30 14	2408	27 13 38	2387	28 57 31	2371	30 41 47	2359
	Jupiter	E.	49 33 9	2265	47 46 18	2265	45 59 27	2266	44 12 37	2266
	α Aquilæ	E.	73 13 5	2943	71 41 41	2958	70 10 36	2976	68 39 53	2995
21	Regulus	W.	93 1 14	2247	94 48 32	2249	96 35 47	2251	98 22 58	2254
	Spica	W.	39 26 49	2322	41 12 17	2319	42 57 49	2316	44 43 25	2314
	Jupiter	E.	35 18 44	2273	33 32 5	2275	31 45 29	2277	29 58 56	2279
	α Aquilæ	E.	61 13 11	3128	59 45 35	3163	58 18 41	3202	56 52 34	3244
	Fomalhaut	E.	92 12 16	2449	90 29 51	2451	88 47 29	2454	87 5 11	2457
	Sun	E.	120 9 41	2574	118 30 10	2576	116 50 42	2578	115 11 17	2580
22	Regulus	W	107 17 47	2271	109 4 29	2275	110 51 5	2279	112 37 35	2283
	Spica	W.	53 31 42	2316	55 17 18	2317	57 2 52	2320	58 48 23	2322
	α Aquilæ	E.	49 56 11	3532	48 36 22	3609	47 17 57	3693	46 1 2	3787
	Fomalhaut	E.	78 35 5	2482	76 53 27	2489	75 11 59	2498	73 30 43	2506
	Sun	E.	106 55 7	2596	105 16 6	2600	103 37 11	2604	101 58 22	2609
23	Spica	W.	67 34 54	2339	69 19 57	2343	71 4 54	2347	72 49 45	2351
	Fomalhaut	E.	65 7 32	2559	63 27 40	2571	61 48 5	2585	60 8 50	2600
	α Pegasi	E.	82 3 36	2701	80 26 57	2710	78 50 30	2719	77 14 16	2731
	Sun	E.	93 45 49	2632	92 7 38	2638	90 29 35	2643	88 51 39	2649
24	Spica	W.	81 32 19	2376	83 16 28	2382	85 0 29	2387	86 44 22	2392
	Antares	W.	35 54 23	2457	37 36 37	2453	39 18 56	2451	41 1 18	2450
	Fomalhaut	E.	51 58 13	2695	50 21 26	2719	48 45 11	2745	47 9 31	2774
	α Pegasi	E.	69 17 10	2800	67 42 42	2818	66 8 37	2836	64 34 56	2855
	Sun	E.	80 43 55	2678	79 6 46	2685	77 29 46	2691	75 52 54	2698
25	Spica	W.	95 21 45	2423	97 4 47	2429	98 47 40	2436	100 30 24	2443
	Antares	W.	49 33 3	2458	51 15 16	2460	52 57 25	2463	54 39 30	2467
	Fomalhaut	E.	39 21 50	2967	37 50 56	3021	36 21 9	3081	34 52 36	3148
	α Pegasi	E.	56 53 33	2981	55 22 56	3013	53 52 59	3047	52 23 44	3083
	Sun	E.	67 50 47	2732	66 14 50	2739	64 39 2	2746	63 3 23	2753
26	Antares	W.	63 8 27	2490	64 49 54	2495	66 31 14	2501	68 12 26	2507
	Jupiter	W.	34 30 19	2469	86 12 16	2475	37 54 4	2482	39 35 42	2489
	Fomalhaut	E.	27 54 12	3677	26 37 1	3844	25 22 44	4041	24 11 45	4277
	α Pegasi	E.	45 10 6	3327	43 46 26	3391	42 23 59	3461	41 2 51	3540
	Sun	E.	55 7 36	2792	53 32 58	2801	51 58 31	2809	50 24 15	2818
27	Antares	W.	76 36 18	2538	78 16 38	2545	79 56 48	2553	81 36 48	2560
	Jupiter	W.	48 1 30	2524	49 42 10	2532	51 22 39	2539	53 2 58	2546
	α Aquilæ	W.	40 7 56	4475	41 12 10	4351	42 18 16	4239	43 26 5	4140
	Sun	E.	42 35 50	2865	41 2 46	2876	39 29 56	2887	37 57 20	2898
28	Antares	W.	89 54 14	2599	91 33 10	2607	93 11 55	2615	94 50 29	2624
	Jupiter	W.	61 21 54	2585	63 1 9	2594	64 40 12	2602	66 19 4	2611
	α Aquilæ	W.	49 25 51	3789	50 41 5	3739	51 57 11	3694	53 14 4	3655
	Sun	E.	30 18 8	2964	28 47 10	2980	27 16 32	2997	25 46 15	3015

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to / Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination	Diff. for 1 Hour.	Semi-diameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Mon.	1	0 43 59.22	9.104	N. 4 43 50.1	+57.75	16 1.95	64.51	3 50.16	0.750
Tues.	2	0 47 37.77	9.110	5 6 53.8	57.53	16 1.67	64.53	3 32.21	0.745
Wed.	3	0 51 16.44	9.115	5 29 52.0	57.30	16 1.39	64.55	3 14.38	0.739
Thur.	4	0 54 55.26	9.121	5 52 44.4	+57.05	16 1.12	64.58	2 56.70	0.733
Frid.	5	0 58 34.25	9.128	6 15 30.6	56.79	16 0.85	64.61	2 39.17	0.726
Sat.	6	1 2 13.41	9.136	6 38 10.3	56.51	16 0 58	64.64	2 21.83	0.718
SUN.	7	1 5 52.76	9.144	7 0 43.1	+56.22	16 0.31	64.67	2 4.68	0.710
Mon.	8	1 9 32.32	9.153	7 23 8.7	55.91	16 0.04	64.70	1 47.74	0.701
Tues.	9	1 13 12.11	9.163	7 45 26.7	55.59	15 59.77	64.74	1 31.02	0.691
Wed.	10	1 16 52 15	9.173	8 7 36.8	+55.25	15 59.51	64.78	1 14.55	0.681
Thur.	11	1 20 32.46	9.184	8 29 38.6	54.90	15 59.24	64.82	0 58.35	0.669
Frid.	12	1 24 13.05	9.196	8 51 31.9	54.53	15 58.97	64.87	0 42.43	0.657
Sat.	13	1 27 53.94	9.210	9 13 16.3	+54.15	15 58.70	64.92	0 26.81	0.644
SUN.	14	1 31 35.15	9.224	9 34 51.4	53.76	15 58.44	64.97	0 11.51	0.630
Mon.	15	1 35 16.70	9.239	9 56 16.9	53.36	15 58.17	65.02	0 3.46	0.615
Tues.	16	1 38 58.61	9.254	10 17 32.6	+52.94	15 57.91	65.08	0 18.06	0.600
Wed.	17	1 42 40.91	9.271	10 38 38.2	52.51	15 57.64	65.13	0 32.29	0.584
Thur.	18	1 46 23.60	9.288	10 59 33.3	52.06	15 57.38	65.19	0 46.11	0.567
Frid.	19	1 50 6.71	9.306	11 20 17.5	+51.61	15 57 11	65.25	0 59.52	0.549
Sat.	20	1 53 50.25	9.324	11 40 50.7	51.14	15 56.85	65.31	1 12.49	0.531
SUN.	21	1 57 34.24	9.343	12 1 12.6	50.66	15 56.59	65.37	1 25.02	0.512
Mon.	22	2 1 18.69	9.363	12 21 22.7	+50.16	15 56.33	65.44	1 37.09	0.493
Tues.	23	2 5 3.62	9.383	12 41 20.7	49.65	15 56.07	65.50	1 48.69	0.473
Wed.	24	2 8 49.03	9.403	13 1 6.3	49.13	15 55.81	65.57	1 59.81	0.452
Thur.	25	2 12 34.93	9.424	13 20 39.3	+48.60	15 55.55	65.64	2 10.43	0.431
Frid.	26	2 16 21.34	9.445	13 39 59.3	48.05	15 55.30	65.71	2 20.53	0.410
Sat.	27	2 20 8.26	9.466	13 59 5.9	47.49	15 55.05	65.78	2 30.13	0.389
SUN.	28	2 23 55.70	9.488	14 17 58.8	+46.92	15 54.80	65.86	2 39.22	0.367
Mon.	29	2 27 43.67	9.510	14 36 37.6	46.33	15 54.56	65.94	2 47.78	0.345
Tues.	30	2 31 32.17	9.532	14 55 2.0	45.72	15 54.32	66.02	2 55.81	0.323
Wed.	31	2 35 21.21	9.554	N.15 13 11.8	+45.10	15 54.08	66.10	3 3.31	0.301

NOTE.—The mean time of semidiameter passing may be found by subtracting $0^{s}.18$ from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	THE SUN'S Diff. for 1 Hour.	THE SUN'S Apparent Declination.	THE SUN'S Diff. for 1 Hour.	Equation of Time, to be Subtracted from / Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ′ ″	″	m s	s	h m s
Mon.	1	0 43 58.63	9.106	N. 4 43 46.4	+57.76	3 50.21	0.750	0 40 8.42
Tues.	2	0 47 37.23	9.112	5 6 50.4	57.54	3 32.25	0.745	0 44 4.98
Wed.	3	0 51 15.95	9.117	5 29 48.9	57.31	3 14.42	0.739	0 48 1.53
Thur.	4	0 54 54.82	9.123	5 52 41.6	+57.06	2 56.74	0.733	0 51 58.08
Frid.	5	0 58 33.85	9.130	6 15 28.1	56.80	2 39.21	0.726	0 55 54.64
Sat.	6	1 2 13.05	9.138	6 38 8.1	56.52	2 21.86	0.718	0 59 51.19
SUN.	7	1 5 52.45	9.146	7 0 41.2	+56.23	2 4.71	0.710	1 3 47.74
Mon.	8	1 9 32.05	9.155	7 23 7.1	55.92	1 47.76	0.701	1 7 44.29
Tues.	9	1 13 11.88	9.165	7 45 25.4	55.60	1 31.03	0.691	1 11 40.85
Wed.	10	1 16 51.96	9.175	8 7 35.7	+55.26	1 14.56	0.681	1 15 37.40
Thur.	11	1 20 32.31	9.187	8 29 37.8	54.91	0 58.35	0.669	1 19 33.96
Frid.	12	1 24 12.94	9.199	8 51 31.3	54.54	0 42.43	0.657	1 23 30.51
Sat.	13	1 27 53 87	9.212	9 13 15.9	+54.16	0 26.81	0.644	1 27 27.06
SUN.	14	1 31 35.12	9.226	9 34 51.2	53.77	0 11.51	0.630	1 31 23.61
Mon.	15	1 35 16.71	9.241	9 56 16.9	53.37	0 3.46	0.615	1 35 20.17
Tues.	16	1 38 58.66	9.256	10 17 32.8	+52.95	0 18.06	0.600	1 39 16.72
Wed.	17	1 42 40.99	9.272	10 38 38.6	52.52	0 32.29	0.584	1 43 13.28
Thur.	18	1 46 23.72	9.289	10 59 33.9	52.07	0 46.12	0.567	1 47 9.84
Frid.	19	1 50 6.86	9.307	11 20 18.3	+51.62	0 59.53	0.549	1 51 6.39
Sat.	20	1 53 50.44	9.325	11 40 51.7	51.15	1 12.50	0.531	1 55 2.94
SUN.	21	1 57 34.46	9.344	12 1 13.7	50.67	1 25.03	0.512	1 58 59.49
Mon.	22	2 1 18.94	9.363	12 21 23.9	+50.17	1 37.10	0.493	2 2 56.04
Tues.	23	2 5 3.90	9.383	12 41 22.1	49.66	1 48.70	0.473	2 6 52.60
Wed.	24	2 8 49.34	9.404	13 1 7.9	49.14	1 59.82	0.452	2 10 49.16
Thur.	25	2 12 35.27	9.425	13 20 41.0	+48.61	2 10.44	0.431	2 14 45.71
Frid.	26	2 16 21.71	9.446	13 40 1.1	48.06	2 20.55	0.410	2 18 42.26
Sat.	27	2 20 8.66	9.467	13 59 7.8	47.50	2 30.15	0.389	2 22 38.81
SUN.	28	2 23 56.13	9.489	14 18 0.8	+46.92	2 39.24	0.367	2 26 35.37
Mon.	29	2 27 44.12	9.511	14 36 39.7	46.33	2 47.80	0.345	2 30 31.92
Tues.	30	2 31 32.64	9.533	14 55 4.2	45.72	2 55.83	0.323	2 34 28.47
Wed.	31	2 35 21.70	9.555	N. 15 13 14.0	+45.10	3 3.33	0.301	2 38 25.03

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

Diff. for 1 hour, + 9ˢ.8565. (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		λ	λ					
		° ′ ″	′ ″	″	″			h m s
1	91	11 57 45.3	57 50.0	147.87	— 0.58	0.0000240	+52.1	23 16 2.24
2	92	12 56 53.2	56 57.8	147.78	0.56	0.0001486	51.8	23 12 6.33
3	93	13 55 58.9	56 3.4	147.69	0.51	0.0002725	51.5	23 8 10.42
4	94	14 55 2.4	55 6.8	147.60	— 0.43	0.0003957	+51.2	23 4 14.51
5	95	15 54 3.7	54 8.0	147.51	0.33	0.0005183	51.0	23 0 18.61
6	96	16 53 2.7	53 6.9	147.41	0.21	0.0006403	50.8	22 56 22.70
7	97	17 51 59.4	52 3.5	147.32	— 0.08	0.0007619	+50.6	22 52 26.79
8	98	18 50 53.8	50 57.8	147.22	+ 0.05	0.0008831	50.4	22 48 30.88
9	99	19 49 45.9	49 49.8	147.13	0.18	0.0010040	50.3	22 44 34.98
10	100	20 48 35.7	48 39.5	147.03	+ 0.29	0.0011248	+50.3	22 40 39.08
11	101	21 47 23.3	47 27.0	146.94	0.39	0.0012455	50.3	22 36 43.17
12	102	22 46 8.7	46 12.3	146.85	0.47	0.0013661	50.3	22 32 47.26
13	103	23 44 51.9	44 55.4	146.76	+ 0.52	0.0014867	+50.3	22 28 51.36
14	104	24 43 33.0	43 36.4	146.67	0.54	0.0016073	50.3	22 24 55.45
15	105	25 42 12.1	42 15.4	146.59	0.54	0.0017280	50.3	22 20 59.54
16	106	26 40 49.2	40 52.4	146.51	+ 0.51	0.0018487	+50.3	22 17 3.63
17	107	27 39 24.4	39 27.5	146.43	0.45	0.0019693	50.3	22 13 7.72
18	108	28 37 57.8	38 0.8	146.35	0.35	0.0020899	50.2	22 9 11.81
19	109	29 36 29.5	36 32.3	146.28	+ 0.23	0.0022104	+50.1	22 5 15.90
20	110	30 34 59.5	35 2.2	146.21	+ 0.11	0.0023305	49.9	22 1 20.00
21	111	31 33 27.9	33 30.5	146.14	— 0.02	0.0024501	49.7	21 57 24.10
22	112	32 31 54.7	31 57.2	146.08	— 0.15	0.0025691	+49.4	21 53 28.19
23	113	33 30 19.9	30 22.3	146.01	0.28	0.0026874	49.1	21 49 32.28
24	114	34 28 43.5	28 45.7	145.95	0.40	0.0028048	48.7	21 45 36.37
25	115	35 27 5.5	27 7.6	145.88	— 0.50	0.0029211	+48.2	21 41 40.46
26	116	36 25 25.9	25 27.9	145.82	0.57	0.0030362	47.7	21 37 44.55
27	117	37 23 44.8	23 46.7	145.75	0.62	0.0031498	47.1	21 33 48.64
28	118	38 22 2.0	22 3.8	145.68	— 0.64	0.0032619	+46.4	21 29 52.73
29	119	39 20 17.6	20 19.2	145.61	0.62	0.0033725	45.8	21 25 56.83
30	120	40 18 31.4	18 32.9	145.54	0.57	0.0034815	45.1	21 22 0.92
31	121	41 16 43.4	16 44.8	145.47	— 0.50	0.0035889	+44.4	21 18 5.01

NOTE.—The numbers in column λ correspond to the true equinox of the date; in column λ′, to the mean equinox of January 0^d.0.

Diff. for 1 Hour,
— 9^s.8296.
(Table II.)

GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	15 10.0	15 6.1	55 33.0	−1.22	55 18.7	−1.16	0 57.3	1.83	1.0
2	15 2.4	14 59.0	55 5.1	1.09	54 52.5	1.00	1 41.3	1.84	2.0
3	14 55.9	14 53.3	54 41.2	0.88	54 31.4	0.75	2 25.7	1.87	3.0
4	14 51.0	14 49.3	54 23.2	−0.61	54 16.8	−0.45	3 11.0	1.91	4.0
5	14 48.1	14 47.5	54 12.5	−0.27	54 10.4	−0.08	3 57.4	1.96	5.0
6	14 47.6	14 48.4	54 10.7	+0.13	54 13.4	+0.33	4 45.1	2.01	6.0
7	14 49.8	14 51.9	54 18.6	+0.54	54 26.3	+0.75	5 33.8	2.05	7.0
8	14 54.7	14 58.2	54 36.6	0.97	54 49.5	1.18	6 23 2	2.07	8.0
9	15 2.4	15 7.2	55 4.9	1.38	55 22.5	1.56	7 12.9	2.07	9.0
10	15 12.6	15 18 5	55 42.3	+1.73	56 4.0	+1.88	8 2.5	2.06	10.0
11	15 24.8	15 31.5	56 27.3	2.00	56 51.9	2.09	8 51.7	2.04	11.0
12	15 38.4	15 45.5	57 17.3	2.14	57 43.1	2.14	9 40.7	2.04	12.0
13	15 52.4	15 59.2	58 8.7	+2.10	58 33.5	+2.02	10 29.8	2.06	13.0
14	16 5.6	16 11.5	58 57.1	1.89	59 18.9	1.71	11 19.6	2.10	14.0
15	16 16.8	16 21.3	59 38.2	1.49	59 54.7	1.24	12 10.9	2.18	15.0
16	16 24.9	16 27.6	60 8.0	+0.96	60 17.7	+0.66	13 4.4	2.28	16 0
17	16 29.2	16 29.8	60 23.7	+0.35	60 26.0	+0.04	14 0.5	2.40	17.0
18	16 29.5	16 28.2	60 24.7	−0.25	60 20.0	−0.53	14 59.2	2.49	18.0
19	16 26.0	16 23.1	60 12.1	−0.77	60 1.5	−0.98	15 59.6	2.53	19.0
20	16 19.6	16 15.6	59 48.6	1.16	59 33.8	1.30	17 0.3	2.51	20.0
21	16 11.1	16 6.4	59 17.4	1.41	59 0.0	1.48	17 59.5	2.42	21.0
22	16 1.5	15 56.5	58 42.0	−1.52	58 23.6	−1.54	18 55.9	2.28	22.0
23	15 51.5	15 46.4	58 5.1	1.54	57 46.7	1.52	19 48.8	2.13	23.0
24	15 41.5	15 36.7	57 28.6	1.49	57 10.9	1.45	20 38.4	2.00	24.0
25	15 32.0	15 27.5	56 53.8	−1.40	56 37.3	−1.36	21 25.3	1.90	25.0
26	15 23.2	15 19.0	56 21.3	1.31	56 6.0	1.25	22 10.1	1.84	26.0
27	15 15.0	15 11.2	55 51.3	1.20	55 37.3	1.14	22 53.9	1.81	27.0
28	15 7.6	15 4.2	55 24.0	−1.08	55 11.4	−1.02	23 37.4	1.82	28.0
29	15 0.9	14 58.0	54 59.6	0.95	54 48.6	0.88	δ		29.0
30	14 55.2	14 52.7	54 38.5	0.79	54 29.4	0.71	0 21.3	1.85	0.4
31	14 50.5	14 48.7	54 21.4	−0.61	54 14.7	−0.50	1 6.1	1.89	1.4

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

MONDAY 1.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	1 35 42.05	1.9445	N. 4 38 39.0	11.750
1	1 37 38.71	1.9442	4 50 23.1	11.721
2	1 39 35.35	1.9438	5 2 5.5	11.692
3	1 41 31.97	1.9435	5 13 46.1	11.661
4	1 43 28.57	1.9432	5 25 24.8	11.629
5	1 45 25.16	1.9430	5 37 1.6	11.597
6	1 47 21.73	1.9428	5 48 36.5	11.565
7	1 49 18.30	1.9427	6 0 9.4	11.531
8	1 51 14.86	1.9426	6 11 40.2	11.496
9	1 53 11.41	1.9425	6 23 8.9	11.461
10	1 55 7.96	1.9425	6 34 35.5	11.425
11	1 57 4.51	1.9426	6 45 59.9	11.389
12	1 59 1.07	1.9427	6 57 22.2	11.352
13	2 0 57.63	1.9428	7 8 42.2	11.313
14	2 2 54.20	1.9429	7 19 59.8	11.274
15	2 4 50.78	1.9431	7 31 15.1	11.235
16	2 6 47.37	1.9434	7 42 28.0	11.194
17	2 8 43.98	1.9437	7 53 38.4	11.153
18	2 10 40.61	1.9440	8 4 46.3	11.111
19	2 12 37.26	1.9443	8 15 51.7	11.068
20	2 14 33.93	1.9447	8 26 54.5	11.025
21	2 16 30.62	1.9451	8 37 54.7	10.982
22	2 18 27.34	1.9456	8 48 52.3	10.937
23	2 20 24.09	1.9462	N. 8 59 47.1	10.892

TUESDAY 2.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	2 22 20.88	1.9467	N. 9 10 39.2	10.845
1	2 24 17.70	1.9473	9 21 28.5	10.798
2	2 26 14.56	1.9479	9 32 15.0	10.751
3	2 28 11.45	1.9485	9 42 58.6	10.702
4	2 30 8.38	1.9492	9 53 39.3	10.653
5	2 32 5.36	1.9500	10 4 17.0	10.603
6	2 34 2.38	1.9508	10 14 51.7	10.553
7	2 35 59.45	1.9516	10 25 23.4	10.503
8	2 37 56.57	1.9524	10 35 52.1	10.451
9	2 39 53.74	1.9533	10 46 17.6	10.398
10	2 41 50.96	1.9542	10 56 39.9	10.345
11	2 43 48.24	1.9551	11 6 59.0	10.292
12	2 45 45.57	1.9560	11 17 14.9	10.237
13	2 47 42.96	1.9571	11 27 27.5	10.182
14	2 49 40.42	1.9582	11 37 36.8	10.127
15	2 51 37.94	1.9592	11 47 42.8	10.072
16	2 53 35.52	1.9603	11 57 45.4	10.014
17	2 55 33.17	1.9614	12 7 44.5	9.956
18	2 57 30.89	1.9626	12 17 40.1	9.898
19	2 59 28.68	1.9638	12 27 32.2	9.839
20	3 1 26.54	1.9650	12 37 20.8	9.780
21	3 3 24.48	1.9662	12 47 5.8	9.719
22	3 5 22.49	1.9675	12 56 47.1	9.658
23	3 7 20.58	1.9688	13 6 24.8	9.597
24	3 9 18.75	1.9702	N.13 15 58.8	9.535

WEDNESDAY 3.

Hour.	Right Ascension	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	3 9 18.75	1.9702	N.13 15 58.8	9.535
1	3 11 17.00	1.9715	13 25 29.0	9.473
2	3 13 15.33	1.9729	13 34 55.5	9.410
3	3 15 13.75	1.9743	13 44 18.2	9.346
4	3 17 12.25	1.9757	13 53 37.0	9.281
5	3 19 10.84	1.9772	14 2 51.9	9.217
6	3 21 9.51	1.9786	14 12 3.0	9.152
7	3 23 8.27	1.9801	14 21 10.1	9.085
8	3 25 7.13	1.9817	14 30 13.2	9.017
9	3 27 6.08	1.9832	14 39 12.2	8.950
10	3 29 5.12	1.9848	14 48 7.2	8.882
11	3 31 4.26	1.9865	14 56 58.1	8.813
12	3 33 3.50	1.9882	15 5 44.8	8.744
13	3 35 2.84	1.9898	15 14 27.4	8.675
14	3 37 2.27	1.9914	15 23 5.8	8.604
15	3 39 1.80	1.9930	15 31 39.9	8.533
16	3 41 1.43	1.9947	15 40 9.8	8.462
17	3 43 1.17	1.9965	15 48 35.3	8.389
18	3 45 1.01	1.9982	15 56 56.5	8.316
19	3 47 0.95	1.9999	16 5 13.3	8.243
20	3 49 1.00	2.0017	16 13 25.7	8.170
21	3 51 1.16	2.0036	16 21 33.7	8.096
22	3 53 1.43	2.0054	16 29 37.2	8.021
23	3 55 1.80	2.0071	N.16 37 36.2	7.945

THURSDAY 4.

Hour.	Right Ascension	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	3 57 2.28	2.0089	N.16 45 30.6	7.869
1	3 59 2.87	2.0108	16 53 20.5	7.793
2	4 1 3.57	2.0127	17 1 5.8	7.716
3	4 3 4.39	2.0146	17 8 46.4	7.638
4	4 5 5.32	2.0164	17 16 22.3	7.559
5	4 7 6.36	2.0183	17 23 53.5	7.481
6	4 9 7.52	2.0202	17 31 20.0	7.402
7	4 11 8.79	2.0221	17 38 41.8	7.322
8	4 13 10.17	2.0240	17 45 58.7	7.242
9	4 15 11.67	2.0260	17 53 10.8	7.162
10	4 17 13.29	2.0279	18 0 18.1	7.081
11	4 19 15.02	2.0298	18 7 20.5	6.999
12	4 21 16.87	2.0318	18 14 17.9	6.916
13	4 23 18.84	2.0337	18 21 10.4	6.833
14	4 25 20.92	2.0357	18 27 57.9	6.750
15	4 27 23.12	2.0377	18 34 40.4	6.667
16	4 29 25.44	2.0397	18 41 17.9	6.582
17	4 31 27.88	2.0417	18 47 50.3	6.497
18	4 33 30.44	2.0437	18 54 17.6	6.412
19	4 35 33.12	2.0456	19 0 39.8	6.327
20	4 37 35.91	2.0475	19 6 56.8	6.240
21	4 39 38.82	2.0496	19 13 8.6	6.153
22	4 41 41.86	2.0517	19 19 15.2	6.066
23	4 43 45.02	2.0537	19 25 16.5	5.979
24	4 45 48.30	2.0557	N.19 31 12.6	5.891

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

FRIDAY 5.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	4 45 48.30	2.0557	N.19 31 12.6	5.891
1	4 47 51.70	2.0576	19 37 3.4	5.802
2	4 49 55.21	2.0595	19 42 48.9	5.713
3	4 51 58.84	2.0615	19 48 29.0	5.623
4	4 54 2.59	2.0635	19 54 3.7	5.533
5	4 56 6.46	2.0655	19 59 33.0	5.443
6	4 58 10.45	2.0675	20 4 56.9	5.353
7	5 0 14.56	2.0694	20 10 15.4	5.262
8	5 2 18.78	2.0713	20 15 28.4	5.170
9	5 4 23.12	2.0733	20 20 35.8	5.078
10	5 6 27.58	2.0752	20 25 37.7	4.985
11	5 8 32.15	2.0772	20 30 34.0	4.893
12	5 10 36.84	2.0792	20 35 24.8	4.800
13	5 12 41.65	2.0811	20 40 10.0	4.706
14	5 14 46.57	2.0829	20 44 49.5	4.611
15	5 16 51.60	2.0848	20 49 23.3	4.517
16	5 18 56.75	2.0867	20 53 51.5	4.422
17	5 21 2.01	2.0887	20 58 14.0	4.327
18	5 23 7.39	2.0906	21 2 30.7	4.231
19	5 25 12.88	2.0924	21 6 41.7	4.135
20	5 27 18.48	2.0942	21 10 46.9	4.038
21	5 29 24.19	2.0960	21 14 46.3	3.941
22	5 31 30.00	2.0978	21 18 39.9	3.844
23	5 33 35.92	2.0996	N.21 22 27.6	3.747

SATURDAY 6.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	5 35 41.95	2.1014	N.21 26 9.5	3.649
1	5 37 48.09	2.1032	21 29 45.5	3.551
2	5 39 54.33	2.1049	21 33 15.6	3.452
3	5 42 0.68	2.1067	21 36 39.7	3.352
4	5 44 7.13	2.1084	21 39 57.9	3.253
5	5 46 13.68	2.1101	21 43 10.1	3.154
6	5 48 20.34	2.1117	21 46 16.4	3.054
7	5 50 27.10	2.1134	21 49 16.6	2.953
8	5 52 33.95	2.1150	21 52 10.8	2.853
9	5 54 40.90	2.1167	21 54 59.0	2.752
10	5 56 47.95	2.1183	21 57 41.1	2.651
11	5 58 55.09	2.1198	22 0 17.1	2.549
12	6 1 2.33	2.1214	22 2 47.0	2.447
13	6 3 9.66	2.1229	22 5 10.8	2.345
14	6 5 17.08	2.1244	22 7 28.4	2.242
15	6 7 24.59	2.1259	22 9 39.9	2.140
16	6 9 32.19	2.1274	22 11 45.2	2.038
17	6 11 39.88	2.1288	22 13 44.4	1.935
18	6 13 47.65	2.1302	22 15 37.4	1.831
19	6 15 55.50	2.1316	22 17 24.1	1.727
20	6 18 3.44	2.1330	22 19 4.6	1.623
21	6 20 11.46	2.1343	22 20 38.9	1.519
22	6 22 19.56	2.1356	22 22 6.9	1.414
23	6 24 27.74	2.1369	22 23 28.6	1.310
24	6 26 35.99	2.1381	N.22 24 44.1	1.206

SUNDAY 7.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	6 26 35.99	2.1381	N.22 24 44.1	1.206
1	6 28 44.31	2.1394	22 25 53.3	1.100
2	6 30 52.71	2.1407	22 26 56.1	0.994
3	6 33 1.19	2.1419	22 27 52.6	0.889
4	6 35 9.74	2.1430	22 28 42.8	0.783
5	6 37 18.35	2.1441	22 29 26.6	0.677
6	6 39 27.03	2.1452	22 30 4.0	0.571
7	6 41 35.78	2.1463	22 30 35.1	0.465
8	6 43 44.59	2.1473	22 30 59.8	0.358
9	6 45 53.46	2.1483	22 31 18.1	0.252
10	6 48 2.39	2.1493	22 31 30.0	0.145
11	6 50 11.38	2.1503	22 31 35.5	+ 0.038
12	6 52 20.43	2.1513	22 31 34.6	− 0.069
13	6 54 29.53	2.1522	22 31 27.2	0.177
14	6 56 38.69	2.1531	22 31 13.4	0.284
15	6 58 47.90	2.1539	22 30 53.2	0.391
16	7 0 57.16	2.1547	22 30 26.5	0.499
17	7 3 6.46	2.1554	22 29 53.3	0.607
18	7 5 15.81	2.1562	22 29 13.7	0.714
19	7 7 25.20	2.1569	22 28 27.6	0.822
20	7 9 34.61	2.1576	22 27 35.0	0.931
21	7 11 44.12	2.1583	22 26 35.9	1.039
22	7 13 53.64	2.1590	22 25 30.3	1.147
23	7 16 3.20	2.1596	N.22 24 18.3	1.254

MONDAY 8.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	7 18 12.79	2.1602	N.22 22 59.8	1.363
1	7 20 22.42	2.1607	22 21 34.8	1.472
2	7 22 32.08	2.1612	22 20 3.2	1.581
3	7 24 41.77	2.1617	22 18 25.1	1.689
4	7 26 51.49	2.1622	22 16 40.6	1.797
5	7 29 1.23	2.1626	22 14 49.5	1.906
6	7 31 11.00	2.1630	22 12 51.9	2.014
7	7 33 20.79	2.1633	22 10 47.8	2.122
8	7 35 30.60	2.1637	22 8 37.2	2.231
9	7 37 40.44	2.1641	22 6 20.1	2.339
10	7 39 50.29	2.1644	22 3 56.5	2.448
11	7 42 0.16	2.1647	22 1 26.4	2.557
12	7 44 10.05	2.1649	21 58 49.7	2.666
13	7 46 19.95	2.1651	21 56 6.5	2.774
14	7 48 29.86	2.1652	21 53 16.8	2.882
15	7 50 39.78	2.1654	21 50 20.6	2.990
16	7 52 49.71	2.1656	21 47 18.0	3.098
17	7 54 59.65	2.1657	21 44 8.9	3.206
18	7 57 9.59	2.1657	21 40 53.3	3.314
19	7 59 19.53	2.1657	21 37 31.2	3.422
20	8 1 29.48	2.1658	21 34 2.6	3.531
21	8 3 39.43	2.1658	21 30 27.5	3.639
22	8 5 49.38	2.1658	21 26 45.9	3.747
23	8 7 59.33	2.1657	21 22 57.9	3.854
24	8 10 9.27	2.1657	N.21 19 3.4	3.962

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

TUESDAY 9.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	8 10 9.27	2.1657	N.21 19 3.4	3.962
1	8 12 19.21	2.1656	21 15 2.5	4.069
2	8 14 29.14	2.1654	21 10 55.1	4.176
3	8 16 39.06	2.1653	21 6 41.3	4.283
4	8 18 48.97	2.1652	21 2 21.1	4.390
5	8 20 58.88	2.1651	20 57 54.5	4.497
6	8 23 8.78	2.1649	20 53 21.5	4.603
7	8 25 18.66	2.1646	20 48 42.1	4.710
8	8 27 28.53	2.1644	20 43 56.3	4.817
9	8 29 38.39	2.1641	20 39 4.1	4.923
10	8 31 48.23	2.1638	20 34 5.6	5.028
11	8 33 58.05	2.1635	20 29 0.7	5.134
12	8 36 7.85	2.1632	20 23 49.5	5.239
13	8 38 17.63	2.1629	20 18 32.0	5.344
14	8 40 27.39	2.1626	20 13 8.2	5.449
15	8 42 37.14	2.1622	20 7 38.1	5.554
16	8 44 46.86	2.1618	20 2 1.7	5.659
17	8 46 56.56	2.1614	19 56 19.0	5.763
18	8 49 6.23	2.1610	19 50 30.1	5.867
19	8 51 15.88	2.1606	19 44 35.0	5.971
20	8 53 25.50	2.1602	19 38 33.6	6.075
21	8 55 35.10	2.1597	19 32 26.0	6.178
22	8 57 44.67	2.1592	19 26 12.3	6.280
23	8 59 54.21	2.1588	N.19 19 52.4	6.383

WEDNESDAY 10.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	9 2 3.73	2.1584	N.19 13 26.3	6.486
1	9 4 13.22	2.1579	19 6 54.1	6.587
2	9 6 22.68	2.1574	19 0 15.8	6.688
3	9 8 32.11	2.1568	18 53 31.5	6.789
4	9 10 41.50	2.1562	18 46 41.1	6.891
5	9 12 50.86	2.1557	18 39 44.6	6.992
6	9 15 0.19	2.1552	18 32 42.1	7.092
7	9 17 9.49	2.1547	18 25 33.6	7.192
8	9 19 18.76	2.1542	18 18 19.1	7.291
9	9 21 28.00	2.1537	18 10 58.7	7.390
10	9 23 37.21	2.1532	18 3 32.3	7.488
11	9 25 46.39	2.1527	17 56 0.1	7.586
12	9 27 55.53	2.1521	17 48 22.0	7.684
13	9 30 4.64	2.1516	17 40 38.0	7.781
14	9 32 13.72	2.1510	17 32 48.2	7.878
15	9 34 22.76	2.1504	17 24 52.6	7.975
16	9 36 31.77	2.1499	17 16 51.2	8.071
17	9 38 40.75	2.1494	17 8 44.1	8.167
18	9 40 49.70	2.1488	17 0 31.2	8.263
19	9 42 58.61	2.1483	16 52 12.6	8.357
20	9 45 7.49	2.1477	16 43 48.4	8.450
21	9 47 16.34	2.1472	16 35 18.6	8.543
22	9 49 25.16	2.1467	16 26 43.2	8.637
23	9 51 33.95	2.1462	16 18 2.2	8.730
24	9 53 42.71	2.1457	N.16 9 15.6	8.822

THURSDAY 11.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	9 53 42.71	2.1457	N.16 9 15.6	8.822
1	9 55 51.44	2.1452	16 0 23.5	8.913
2	9 58 0.14	2.1447	15 51 26.0	9.004
3	10 0 8.81	2.1442	15 42 23.0	9.095
4	10 2 17.45	2.1437	15 33 14.6	9.185
5	10 4 26.06	2.1433	15 24 0.8	9.274
6	10 6 34.65	2.1429	15 14 41.7	9.362
7	10 8 43.21	2.1424	15 5 17.3	9.451
8	10 10 51.74	2.1420	14 55 47.6	9.539
9	10 13 0.25	2.1416	14 46 12.6	9.627
10	10 15 8.74	2.1412	14 36 32.4	9.713
11	10 17 17.20	2.1408	14 26 47.1	9.798
12	10 19 25.64	2.1405	14 16 56.7	9.883
13	10 21 34.06	2.1402	14 7 1.2	9.968
14	10 23 42.46	2.1398	13 57 0.6	10.052
15	10 25 50.84	2.1395	13 46 55.0	10.135
16	10 27 59.20	2.1392	13 36 44.4	10.217
17	10 30 7.55	2.1390	13 26 28.9	10.299
18	10 32 15.88	2.1387	13 16 8.5	10.380
19	10 34 24.20	2.1385	13 5 43.3	10.461
20	10 36 32.50	2.1383	12 55 13.2	10.542
21	10 38 40.79	2.1381	12 44 38.3	10.621
22	10 40 49.07	2.1379	12 33 58.7	10.698
23	10 42 57.34	2.1378	N.12 23 14.5	10.775

FRIDAY 12.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	10 45 5.61	2.1377	N.12 12 25.7	10.852
1	10 47 13.87	2.1376	12 1 32.3	10.928
2	10 49 22.12	2.1375	11 50 34.3	11.004
3	10 51 30.37	2.1375	11 39 31.8	11.079
4	10 53 38.62	2.1375	11 28 24.8	11.153
5	10 55 46.87	2.1376	11 17 13.4	11.226
6	10 57 55.13	2.1377	11 5 57.7	11.297
7	11 0 3.39	2.1377	10 54 37.7	11.368
8	11 2 11.65	2.1378	10 43 13.5	11.438
9	11 4 19.92	2.1379	10 31 45.1	11.508
10	11 6 28.20	2.1381	10 20 12.5	11.577
11	11 8 36.49	2.1383	10 8 35.8	11.646
12	11 10 44.79	2.1385	9 56 55.0	11.713
13	11 12 53.11	2.1387	9 45 10.2	11.779
14	11 15 1.44	2.1390	9 33 21.5	11.844
15	11 17 9.79	2.1394	9 21 28.9	11.908
16	11 19 18.17	2.1398	9 9 32.5	11.972
17	11 21 26.57	2.1402	8 57 32.3	12.035
18	11 23 34.99	2.1406	8 45 28.3	12.097
19	11 25 43.44	2.1411	8 33 20.6	12.158
20	11 27 51.92	2.1416	8 21 9.3	12.217
21	11 30 0.43	2.1421	8 8 54.5	12.276
22	11 32 8.97	2.1427	7 56 36.2	12.334
23	11 34 17.55	2.1433	7 44 14.4	12.391
24	11 36 26.17	2.1440	N. 7 31 49.3	12.446

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	SATURDAY 13.					**MONDAY 15.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	11 36 26.17	2.1440	N. 7 31 49.3	12.446	0	13 20 55.61	2.2276	S. 3 8 21.5	13.739
1	11 38 34.83	2.1447	7 19 20.9	12.501	1	13 23 9.35	2.2305	3 22 5.7	13.732
2	11 40 43.53	2.1454	7 6 49.2	12.556	2	13 25 23.27	2.2334	3 35 49.4	13.724
3	11 42 52.28	2.1462	6 54 14.2	12.609	3	13 27 37.36	2.2363	3 49 32.6	13.715
4	11 45 1.07	2.1470	6 41 36.1	12.660	4	13 29 51.63	2.2393	4 3 15.2	13.704
5	11 47 9.92	2.1479	6 28 55.0	12.710	5	13 32 6.08	2.2424	4 16 57.1	13.691
6	11 49 18.82	2.1488	6 16 10.9	12.760	6	13 34 20.72	2.2456	4 30 38.1	13.677
7	11 51 27.78	2.1497	6 3 23.8	12.809	7	13 36 35.55	2.2487	4 44 18.3	13.662
8	11 53 36.79	2.1507	5 50 33.8	12.857	8	13 38 50.57	2.2519	4 57 57.5	13.644
9	11 55 45.86	2.1517	5 37 41.0	12.903	9	13 41 5.78	2.2552	5 11 35.6	13.625
10	11 57 54.99	2.1528	5 24 45.4	12.948	10	13 43 21.19	2.2584	5 25 12.5	13.605
11	12 0 4.19	2.1539	5 11 47.2	12.992	11	13 45 36.79	2.2617	5 38 48.2	13.583
12	12 2 13.46	2.1551	4 58 46.4	13.035	12	13 47 52.59	2.2651	5 52 22.5	13.559
13	12 4 22.80	2.1563	4 45 43.0	13.077	13	13 50 8.60	2.2686	6 5 55.3	13.534
14	12 6 32.21	2.1575	4 32 37.1	13.117	14	13 52 24.82	2.2720	6 19 26.6	13.507
15	12 8 41.70	2.1588	4 19 28.9	13.157	15	13 54 41.24	2.2754	6 32 56.2	13.479
16	12 10 51.27	2.1601	4 6 18.3	13.196	16	13 56 57.87	2.2790	6 46 24.1	13.449
17	12 13 0.92	2.1614	3 53 5.4	13.233	17	13 59 14.72	2.2826	6 59 50.1	13.417
18	12 15 10.64	2.1628	3 39 50.3	13.269	18	14 1 31.78	2.2862	7 13 14.1	13.383
19	12 17 20.45	2.1643	3 26 33.1	13.304	19	14 3 49.06	2.2898	7 26 36.1	13.349
20	12 19 30.36	2.1659	3 13 13.8	13.337	20	14 6 6.56	2.2935	7 39 56.0	13.312
21	12 21 40.36	2.1675	2 59 52.6	13.369	21	14 8 24.28	2.2972	7 53 13.6	13.274
22	12 23 50.46	2.1691	2 46 29.5	13.400	22	14 10 42.22	2.3009	8 6 28.9	13.234
23	12 26 0.65	2.1707	N. 2 33 4.6	13.430	23	14 13 0.39	2.3047	S. 8 19 41.7	13.192
	SUNDAY 14.					**TUESDAY 16.**			
0	12 28 10.94	2.1724	N. 2 19 37.9	13.459	0	14 15 18.79	2.3086	S. 8 32 51.9	13.148
1	12 30 21.34	2.1742	2 6 9.5	13.487	1	14 17 37.42	2.3124	8 45 59.5	13.104
2	12 32 31.84	2.1759	1 52 39.5	13.513	2	14 19 56.28	2.3163	8 59 4.4	13.057
3	12 34 42.45	2.1777	1 39 8.0	13.537	3	14 22 15.37	2.3202	9 12 6.4	13.009
4	12 36 53.17	2.1797	1 25 35.1	13.560	4	14 24 34.70	2.3242	9 25 5.5	12.959
5	12 39 4.01	2.1817	1 12 0.8	13.582	5	14 26 54.27	2.3281	9 38 1.5	12.907
6	12 41 14.97	2.1837	0 58 25.2	13.603	6	14 29 14.07	2.3320	9 50 54.4	12.854
7	12 43 26.05	2.1857	0 44 48.4	13.622	7	14 31 34.11	2.3360	10 3 44.0	12.799
8	12 45 37.25	2.1878	0 31 10.5	13.641	8	14 33 54.39	2.3401	10 16 30.3	12.742
9	12 47 48.58	2.1899	0 17 31.5	13.658	9	14 36 14.92	2.3442	10 29 13.1	12.684
10	12 50 0.04	2.1921	N. 0 3 51.5	13.673	10	14 38 35.69	2.3483	10 41 52.4	12.624
11	12 52 11.63	2.1943	S. 0 9 49.3	13.687	11	14 40 56.71	2.3524	10 54 28.0	12.562
12	12 54 23.35	2.1965	0 23 30.9	13.700	12	14 43 17.98	2.3566	11 6 59.9	12.499
13	12 56 35.21	2.1988	0 37 13.3	13.711	13	14 45 39.50	2.3607	11 19 27.9	12.434
14	12 58 47.21	2.2012	0 50 56.3	13.721	14	14 48 1.26	2.3648	11 31 52.0	12.367
15	13 0 59.36	2.2037	1 4 39.8	13.729	15	14 50 23.27	2.3689	11 44 12.0	12.299
16	13 3 11.66	2.2062	1 18 23.8	13.736	16	14 52 45.53	2.3731	11 56 27.9	12.229
17	13 5 24.10	2.2086	1 32 8.1	13.741	17	14 55 8.04	2.3773	12 8 39.5	12.157
18	13 7 36.69	2.2112	1 45 52.7	13.745	18	14 57 30.81	2.3816	12 20 46.7	12.083
19	13 9 49.44	2.2138	1 59 37.5	13.748	19	14 59 53.83	2.3858	12 32 49.5	12.008
20	13 12 2.35	2.2164	2 13 22.4	13.749	20	15 2 17.10	2.3900	12 44 47.7	11.932
21	13 14 15.41	2.2191	2 27 7.4	13.749	21	15 4 40.63	2.3943	12 56 41.3	11.853
22	13 16 28.64	2.2219	2 40 52.3	13.747	22	15 7 4.42	2.3986	13 8 30.1	11.773
23	13 18 42.04	2.2247	2 54 37.0	13.743	23	15 9 28.46	2.4028	13 20 14.1	11.692
24	13 20 55.61	2.2276	S. 3 8 21.5	13.739	24	15 11 52.75	2.4070	S. 13 31 53.1	11.608

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

WEDNESDAY 17.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	15 11 52.75	2.4070	S. 13 31 53.1	11.608
1	15 14 17.30	2.4112	13 43 27.1	11.523
2	15 16 42.10	2.4155	13 54 55.9	11.437
3	15 19 7.16	2.4197	14 6 19.5	11.348
4	15 21 32.47	2.4240	14 17 37.7	11.258
5	15 23 58.04	2.4282	14 28 50.5	11.166
6	15 26 23.86	2.4324	14 39 57.7	11.073
7	15 28 49.93	2.4367	14 50 59.3	10.979
8	15 31 16.26	2.4409	15 1 55.2	10.883
9	15 33 42.84	2.4451	15 12 45.3	10.785
10	15 36 9.67	2.4492	15 23 29.4	10.685
11	15 38 36.75	2.4534	15 34 7.5	10.584
12	15 41 4.08	2.4576	15 44 39.5	10.482
13	15 43 31.66	2.4617	15 55 5.3	10.378
14	15 45 59.48	2.4657	16 5 24.8	10.273
15	15 48 27.55	2.4698	16 15 38.0	10.166
16	15 50 55.86	2.4738	16 25 44.7	10.057
17	15 53 24.41	2.4779	16 35 44.8	9.947
18	15 55 53.21	2.4819	16 45 38.3	9.836
19	15 58 22.24	2.4858	16 55 25.1	9.723
20	16 0 51.51	2.4897	17 5 5.1	9.609
21	16 3 21.01	2.4936	17 14 38.2	9.493
22	16 5 50.74	2.4974	17 24 4.3	9.376
23	16 8 20.70	2.5012	S. 17 33 23.3	9.257

THURSDAY 18.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	16 10 50.88	2.5049	S. 17 42 35.2	9.138
1	16 13 21.29	2.5086	17 51 39.9	9.017
2	16 15 51.92	2.5123	18 0 37.2	8.893
3	16 18 22.77	2.5159	18 9 27.1	8.769
4	16 20 53.83	2.5194	18 18 9.5	8.644
5	16 23 25.10	2.5230	18 26 44.4	8.518
6	16 25 56.59	2.5265	18 35 11.7	8.391
7	16 28 28.28	2.5299	18 43 31.3	8.262
8	16 31 0.17	2.5332	18 51 43.1	8.132
9	16 33 32.26	2.5364	18 59 47.1	8.001
10	16 36 4.54	2.5396	19 7 43.2	7.868
11	16 38 37.01	2.5427	19 15 31.3	7.734
12	16 41 9.67	2.5458	19 23 11.3	7.599
13	16 43 42.51	2.5488	19 30 43.2	7.464
14	16 46 15.53	2.5518	19 38 7.0	7.327
15	16 48 48.72	2.5546	19 45 22.5	7.189
16	16 51 22.08	2.5573	19 52 29.7	7.050
17	16 53 55.60	2.5601	19 59 28.5	6.910
18	16 56 29.29	2.5628	20 6 18.9	6.769
19	16 59 3.14	2.5653	20 13 0.8	6.627
20	17 1 37.13	2.5677	20 19 34.2	6.485
21	17 4 11.26	2.5700	20 25 59.0	6.341
22	17 6 45.53	2.5723	20 32 15.1	6.197
23	17 9 19.94	2.5746	20 38 22.6	6.052
24	17 11 54.48	2.5767	S. 20 44 21.3	5.905

FRIDAY 19.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	17 11 54.48	2.5767	S. 20 44 21.3	5.905
1	17 14 29.14	2.5787	20 50 11.2	5.758
2	17 17 3.92	2.5807	20 55 52.3	5.611
3	17 19 38.82	2.5825	21 1 24.5	5.462
4	17 22 13.82	2.5842	21 6 47.7	5.313
5	17 24 48.92	2.5858	21 12 2.0	5.163
6	17 27 24.12	2.5873	21 17 7.3	5.012
7	17 29 59.41	2.5888	21 22 3.5	4.861
8	17 32 34.78	2.5901	21 26 50.6	4.710
9	17 35 10.22	2.5913	21 31 28.7	4.558
10	17 37 45.74	2.5925	21 35 57.6	4.405
11	17 40 21.32	2.5935	21 40 17.3	4.251
12	17 42 56.96	2.5944	21 44 27.8	4.097
13	17 45 32.65	2.5952	21 48 29.0	3.943
14	17 48 8.39	2.5960	21 52 21.0	3.790
15	17 50 44.17	2.5966	21 56 3.8	3.636
16	17 53 19.98	2.5971	21 59 37.3	3.480
17	17 55 55.82	2.5975	22 3 1.4	3.324
18	17 58 31.68	2.5977	22 6 16.2	3.168
19	18 1 7.55	2.5979	22 9 21.6	3.012
20	18 3 43.43	2.5980	22 12 17.7	2.856
21	18 6 19.31	2.5979	22 15 4.4	2.700
22	18 8 55.18	2.5977	22 17 41.7	2.543
23	18 11 31.04	2.5974	S. 22 20 9.6	2.387

SATURDAY 20.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	18 14 6.87	2.5970	S. 22 22 28.2	2.231
1	18 16 42.68	2.5966	22 24 37.3	2.074
2	18 19 18.46	2.5960	22 26 37.0	1.917
3	18 21 54.20	2.5952	22 28 27.3	1.759
4	18 24 29.89	2.5943	22 30 8.1	1.602
5	18 27 5.52	2.5933	22 31 39.6	1.446
6	18 29 41.09	2.5923	22 33 1.7	1.290
7	18 32 16.60	2.5912	22 34 14.4	1.133
8	18 34 52.03	2.5898	22 35 17.7	0.977
9	18 37 27.38	2.5884	22 36 11.6	0.821
10	18 40 2.64	2.5869	22 36 56.2	0.665
11	18 42 37.81	2.5853	22 37 31.4	0.509
12	18 45 12.88	2.5836	22 37 57.3	0.353
13	18 47 47.84	2.5817	22 38 13.8	0.198
14	18 50 22.69	2.5798	22 38 21.1	− 0.044
15	18 52 57.42	2.5777	22 38 19.1	+ 0.111
16	18 55 32.02	2.5756	22 38 7.8	0.265
17	18 58 6.49	2.5733	22 37 47.3	0.418
18	19 0 40.82	2.5709	22 37 17.6	0.571
19	19 3 15.00	2.5684	22 36 38.7	0.724
20	19 5 49.03	2.5659	22 35 50.7	0.877
21	19 8 22.91	2.5632	22 34 53.5	1.029
22	19 10 56.62	2.5604	22 33 47.2	1.180
23	19 13 30.16	2.5576	22 32 31.9	1.330
24	19 16 3.53	2.5547	S. 22 31 7.6	1.480

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	SUNDAY 21.					**TUESDAY 23.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	19 16 3.53	2.5547	S.22 31 7.6	1.480	0	21 13 48.86	2.3321	S.18 43 3.9	7.631
1	19 18 36.72	2.5516	22 29 34.3	1.630	1	21 16 8.62	2.3266	18 35 23.0	7.732
2	19 21 9.72	2.5483	22 27 52.0	1.779	2	21 18 28.05	2.3211	18 27 36.1	7.832
3	19 23 42.52	2.5450	22 26 0.8	1.927	3	21 20 47.15	2.3155	18 19 43 2	7.931
4	19 26 15.12	2.5417	22 24 0.8	2.074	4	21 23 5.91	2.3099	18 11 44.4	8.027
5	19 28 47.52	2.5383	22 21 52.0	2.221	5	21 25 24.34	2.3044	18 3 39.9	8.123
6	19 31 19.71	2.5348	22 19 34.3	2.367	6	21 27 42.44	2.2989	17 55 29.6	8.219
7	19 33 51.69	2.5312	22 17 7.9	2.512	7	21 30 0.21	2.2934	17 47 13.6	8.313
8	19 36 23.45	2.5274	22 14 32.8	2.657	8	21 32 17.65	2.2880	17 38 52.0	8.406
9	19 38 54.98	2.5236	22 11 49.1	2.801	9	21 34 34.77	2.2826	17 30 24.9	8.497
10	19 41 26.29	2.5198	22 8 56.7	2.944	10	21 36 51.56	2.2771	17 21 52.3	8.587
11	19 43 57.36	2.5158	22 5 55.8	3.086	11	21 39 8.02	2.2716	17 13 14.4	8.676
12	19 46 28.19	2.5118	22 2 46.4	3.227	12	21 41 24.15	2.2662	17 4 31.2	8.763
13	19 48 58.78	2.5077	21 59 28.6	3.367	13	21 43 39.96	2.2607	16 55 42.8	8.850
14	19 51 29.12	2.5036	21 56 2.3	3.507	14	21 45 55.44	2.2552	16 46 49.2	8.936
15	19 53 59.21	2.4993	21 52 27.7	3.646	15	21 48 10.59	2.2498	16 37 50.5	9.020
16	19 56 29.04	2.4950	21 48 44.8	3.783	16	21 50 25.42	2.2445	16 28 46.8	9.103
17	19 58 58.61	2.4907	21 44 53.7	3.920	17	21 52 39.93	2.2392	16 19 38.1	9.185
18	20 1 27.92	2.4862	21 40 54.4	4.056	18	21 54 54.12	2.2338	16 10 24.6	9.265
19	20 3 56.96	2.4817	21 36 47.0	4.191	19	21 57 7.99	2.2285	16 1 6.3	9.344
20	20 6 25.72	2.4771	21 32 31.5	4.325	20	21 59 21.54	2.2232	15 51 43.3	9.422
21	20 8 54.21	2.4725	21 28 8.0	4.457	21	22 1 34.77	2.2179	15 42 15.6	9.500
22	20 11 22.42	2.4677	21 23 36.6	4.589	22	22 3 47.69	2.2127	15 32 43.3	9.576
23	20 13 50.34	2.4629	S.21 18 57.3	4.721	23	22 6 0.30	2.2075	S.15 23 6.5	9.650
	MONDAY 22.					**WEDNESDAY 24.**			
0	20 16 17.98	2.4581	S.21 14 10.1	4.851	0	22 8 12.59	2.2023	S.15 13 25.3	9.723
1	20 18 45.33	2.4533	21 9 15.2	4.979	1	22 10 24.57	2.1971	15 3 39.7	9.796
2	20 21 12.38	2.4484	21 4 12.6	5.107	2	22 12 36.24	2.1920	14 53 49.8	9.867
3	20 23 39.14	2.4435	20 59 2.4	5.233	3	22 14 47.61	2.1869	14 43 55.7	9.937
4	20 26 5.60	2.4385	20 53 44.6	5.359	4	22 16 58.67	2.1818	14 33 57.4	10.005
5	20 28 31.76	2.4335	20 48 19.3	5.483	5	22 19 9.43	2.1768	14 23 55.1	10.072
6	20 30 57.62	2.4284	20 42 46.6	5.607	6	22 21 19.89	2.1718	14 13 48.8	10.138
7	20 33 23.17	2.4232	20 37 6.5	5.729	7	22 23 30.05	2.1669	14 3 38.6	10.203
8	20 35 48.41	2.4181	20 31 19.1	5.850	8	22 25 39.92	2.1620	13 53 24.4	10.268
9	20 38 13.34	2.4129	20 25 24.5	5.970	9	22 27 49.49	2.1571	13 43 6.4	10.331
10	20 40 37.96	2.4077	20 19 22.7	6.089	10	22 29 58.77	2.1523	13 32 44.7	10.392
11	20 43 2.26	2.4024	20 13 13.8	6.207	11	22 32 7.76	2.1474	13 22 19.3	10.453
12	20 45 26.25	2.3971	20 6 57.8	6.324	12	22 34 16.46	2.1427	13 11 50.3	10.513
13	20 47 49.92	2.3918	20 0 34.9	6.439	13	22 36 24.88	2.1380	13 1 17.8	10.571
14	20 50 13.27	2.3864	19 54 5.1	6.553	14	22 38 33.02	2.1333	12 50 41.8	10.627
15	20 52 36.29	2.3810	19 47 28.5	6.667	15	22 40 40.88	2.1287	12 40 2.5	10.682
16	20 54 58.99	2.3756	19 40 45.1	6.778	16	22 42 48.46	2.1240	12 29 19.9	10.737
17	20 57 21.37	2.3702	19 33 55.1	6.888	17	22 44 55.76	2.1194	12 18 34.0	10.792
18	20 59 43.42	2.3648	19 26 58.5	6.998	18	22 47 2.79	2.1149	12 7 44.8	10.846
19	21 2 5.15	2.3594	19 19 55.3	7.107	19	22 49 9.55	2.1105	11 56 52.5	10.897
20	21 4 26.55	2.3539	19 12 45.6	7.214	20	22 51 16.05	2.1061	11 45 57.2	10.947
21	21 6 47.62	2.3484	19 5 29.6	7.319	21	22 53 22.28	2.1017	11 34 58.9	10.996
22	21 9 8.36	2.3429	18 58 7.3	7.424	22	22 55 28.25	2.0974	11 23 57.7	11.044
23	21 11 28.77	2.3375	18 50 38.7	7.528	23	22 57 33.97	2.0932	11 12 53.6	11.092
24	21 13 48.86	2.3321	S.18 43 3.9	7.631	24	22 59 39.43	2.0889	S.11 1 46.7	11.138

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

THURSDAY 25.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	22 59 39.43	2.0889	S. 11 1 46.7	11.138
1	23 1 44.64	2.0847	10 50 37.1	11.183
2	23 3 49.60	2.0806	10 39 24.8	11.227
3	23 5 54.31	2.0765	10 28 9.9	11.270
4	23 7 58.78	2.0725	10 16 52.4	11.312
5	23 10 3.01	2.0685	10 5 32.5	11.352
6	23 12 7.00	2.0646	9 54 10.2	11.391
7	23 14 10.76	2.0607	9 42 45.6	11.429
8	23 16 14.29	2.0568	9 31 18.7	11.467
9	23 18 17.58	2.0530	9 19 49.5	11.505
10	23 20 20.65	2.0493	9 8 18.1	11.541
11	23 22 23.50	2.0457	8 56 44.6	11.575
12	23 24 26.13	2.0421	8 45 9.1	11.609
13	23 26 28.55	2.0385	8 33 31.6	11.641
14	23 28 30.75	2.0349	8 21 52.2	11.672
15	23 30 32.74	2.0315	8 10 11.0	11.702
16	23 32 34.53	2.0281	7 58 28.0	11.732
17	23 34 36.11	2.0247	7 46 43.2	11.761
18	23 36 37.49	2.0214	7 34 56.7	11.788
19	23 38 38.68	2.0181	7 23 8.6	11.814
20	23 40 39.67	2.0149	7 11 19.0	11.839
21	23 42 40.47	2.0118	6 59 27.9	11.864
22	23 44 41.09	2.0087	6 47 35.3	11.888
23	23 46 41.52	2.0057	S. 6 35 41.3	11.911

FRIDAY 26

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	23 48 41.77	2.0027	S. 6 23 46.0	11.932
1	23 50 41.85	1.9998	6 11 49.5	11.952
2	23 52 41.75	1.9969	5 59 51.8	11.972
3	23 54 41.48	1.9941	5 47 52.9	11.991
4	23 56 41.04	1.9913	5 35 52.9	12.009
5	23 58 40.44	1.9886	5 23 51.8	12.027
6	0 0 39.68	1.9860	5 11 49.7	12.043
7	0 2 38.76	1.9834	4 59 46.7	12.057
8	0 4 37.69	1.9809	4 47 42.9	12.070
9	0 6 36.47	1.9784	4 35 38.3	12.083
10	0 8 35.10	1.9760	4 23 32.9	12.096
11	0 10 33.59	1.9736	4 11 26.8	12.107
12	0 12 31.93	1.9713	3 59 20.1	12.117
13	0 14 30.14	1.9690	3 47 12.8	12.127
14	0 16 28.21	1.9668	3 35 4.9	12.135
15	0 18 26.15	1.9647	3 22 56.6	12.143
16	0 20 23.97	1.9626	3 10 47.8	12.150
17	0 22 21.66	1.9605	2 58 38.6	12.156
18	0 24 19.23	1.9585	2 46 29.1	12.161
19	0 26 16.68	1.9566	2 34 19.3	12.165
20	0 28 14.02	1.9547	2 22 9.3	12.168
21	0 30 11.25	1.9529	2 9 59.2	12.170
22	0 32 8.37	1.9512	1 57 48.9	12.172
23	0 34 5.39	1.9494	1 45 38.6	12.172
24	0 36 2.30	1.9477	S. 1 33 28.3	12.172

SATURDAY 27.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	0 36 2.30	1.9477	S. 1 33 28.3	12.172
1	0 37 59.11	1.9461	1 21 18.0	12.171
2	0 39 55.83	1.9446	1 9 7.8	12.168
3	0 41 52.46	1.9431	0 56 57.8	12.165
4	0 43 49.00	1.9417	0 44 48.0	12.162
5	0 45 45.46	1.9402	0 32 38.4	12.158
6	0 47 41.83	1.9388	0 20 29.1	12.152
7	0 49 38.12	1.9376	S. 0 8 20.2	12.145
8	0 51 34.34	1.9364	N. 0 3 48.3	12.138
9	0 53 30.49	1.9352	0 15 56.4	12.131
10	0 55 26.57	1.9341	0 28 4.0	12.122
11	0 57 22.58	1.9329	0 40 11.0	12.112
12	0 59 18.52	1.9319	0 52 17.4	12.102
13	1 1 14.41	1.9310	1 4 23.2	12.090
14	1 3 10.24	1.9300	1 16 28.2	12.078
15	1 5 6.01	1.9291	1 28 32.5	12.065
16	1 7 1.73	1.9283	1 40 36.0	12.052
17	1 8 57.41	1.9276	1 52 38.7	12.038
18	1 10 53.04	1.9268	2 4 40.5	12.022
19	1 12 48.63	1.9261	2 16 41.3	12.005
20	1 14 44.18	1.9255	2 28 41.1	11.988
21	1 16 39.69	1.9249	2 40 39.9	11.971
22	1 18 35.17	1.9244	2 52 37.6	11.952
23	1 20 30.62	1.9240	N. 3 4 34.1	11.932

SUNDAY 28.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	1 22 26.05	1.9236	N. 3 16 29.5	11.912
1	1 24 21.45	1.9232	3 28 23.6	11.891
2	1 26 16.83	1.9229	3 40 16.4	11.869
3	1 28 12.19	1.9226	3 52 7.9	11.847
4	1 30 7.54	1.9223	4 3 58.0	11.823
5	1 32 2.87	1.9221	4 15 46.7	11.799
6	1 33 58.19	1.9220	4 27 33.9	11.774
7	1 35 53.51	1.9219	4 39 19.6	11.749
8	1 37 48.82	1.9218	4 51 3.8	11.723
9	1 39 44.13	1.9218	5 2 46.4	11.696
10	1 41 39.44	1.9219	5 14 27.3	11.667
11	1 43 34.76	1.9220	5 26 6.5	11.638
12	1 15 30.08	1.9221	5 37 43.9	11.608
13	1 47 25.41	1.9223	5 49 19.5	11.578
14	1 49 20.75	1.9225	6 0 53.3	11.547
15	1 51 16.11	1.9227	6 12 25.2	11.515
16	1 53 11.48	1.9231	6 23 55.1	11.483
17	1 55 6.88	1.9235	6 35 23.1	11.450
18	1 57 2.30	1.9238	6 46 49.1	11.416
19	1 58 57.74	1.9242	6 58 13.0	11.380
20	2 0 53.21	1.9247	7 9 34.7	11.344
21	2 2 48.71	1.9252	7 20 54.3	11.308
22	2 4 44.24	1.9257	7 32 11.7	11.271
23	2 6 39.80	1.9263	7 43 26.8	11.233
24	2 8 35.40	1.9270	N. 7 54 39.7	11.195

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	MONDAY 29.			
	h m s	s	° ′ ″	″
0	2 8 35.40	1.9270	N. 7 54 39.7	11.195
1	2 10 31.04	1.9277	8 5 50.2	11.155
2	2 12 26.72	1.9284	8 16 58.3	11.115
3	2 14 22.45	1.9292	8 28 4.0	11.074
4	2 16 18.23	1.9301	8 39 7.2	11.033
5	2 18 14.06	1.9309	8 50 7.9	10.991
6	2 20 9.94	1.9317	9 1 6.1	10.947
7	2 22 5.87	1.9326	9 12 1.6	10.903
8	2 24 1.85	1.9335	9 22 54.5	10.859
9	2 25 57.89	1.9345	9 33 44.7	10.814
10	2 27 53.99	1.9355	9 44 32.2	10.768
11	2 29 50.15	1.9366	9 55 16.9	10.722
12	2 31 46.38	1.9377	10 5 58.8	10.674
13	2 33 42.68	1.9388	10 16 37.8	10.626
14	2 35 39.04	1.9399	10 27 13.9	10.577
15	2 37 35.47	1.9411	10 37 47.1	10.528
16	2 39 31.98	1.9424	10 48 17.3	10.478
17	2 41 28.56	1.9436	10 58 44.4	10.427
18	2 43 25.21	1.9449	11 9 8.5	10.375
19	2 45 21.94	1.9462	11 19 29.4	10.323
20	2 47 18.75	1.9476	11 29 47.2	10.270
21	2 49 15.65	1.9490	11 40 1.8	10.216
22	2 51 12.63	1.9503	11 50 13.1	10.161
23	2 53 9.69	1.9517	N.12 0 21.1	10.106
	TUESDAY 30.			
0	2 55 6.84	1.9532	N.12 10 25.9	10.051
1	2 57 4.08	1.9547	12 20 27.3	9.994
2	2 59 1.41	1.9562	12 30 25.2	9.937
3	3 0 58.83	1.9577	12 40 19.7	9.879
4	3 2 56.34	1.9593	12 50 10.7	9.821
5	3 4 53.95	1.9610	12 59 58.2	9.762
6	3 6 51.66	1.9626	13 9 42.1	9.702
7	3 8 49.47	1.9642	13 19 22.4	9.641
8	3 10 47.37	1.9659	13 28 59.0	9.580
9	3 12 45.37	1.9676	13 38 32.0	9.519
10	3 14 43.48	1.9693	13 48 1.3	9.456
11	3 16 41.69	1.9710	13 57 26.8	9.392
12	3 18 40.00	1.9728	14 6 48.4	9.328
13	3 20 38.42	1.9746	14 16 6.2	9.264
14	3 22 36.95	1.9763	14 25 20.1	9.199
15	3 24 35.58	1.9781	14 34 30.1	9.133
16	3 26 34.32	1.9799	14 43 36.1	9.067
17	3 28 33.17	1.9818	14 52 38.1	8.999
18	3 30 32.14	1.9837	15 1 36.0	8.931
19	3 32 31.22	1.9856	15 10 29.8	8.863
20	3 34 30.41	1.9675	15 19 19.5	8.794
21	3 36 29.72	1.9894	15 28 5.1	8.725
22	3 38 29.14	1.9913	15 36 46.5	8.654
23	3 40 28.68	1.9933	15 45 23.6	8.583
24	3 42 28.34	1.9953	N.15 53 56.5	8.512

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	WEDNESDAY, MAY 1.			
	h m s	s	° ′ ″	″
0	3 42 28.34	1.9953	N.15 53 56.5	8.512

PHASES OF THE MOON.

		d	h	m
☽ First Quarter	April	8	1	47.0
○ Full Moon	. . . .	15	10	18.6
☾ Last Quarter	. . . .	22	1	55.8
● New Moon	. . . .	29	14	4.9

		d	h
☾ Apogee	April	5	16.5
☾ Perigee	. . . . .	17	13.5

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Sun	W.	12° 53′ 16″	3502	14° 13′ 38″	3454	15° 34′ 54″	3421	16° 56′ 47″	3399
	Aldebaran	E.	44 10 42	2831	42 36 54	2841	41 3 19	2852	39 29 58	2862
	Pollux	E.	88 25 12	2849	86 51 48	2859	85 18 37	2869	83 45 38	2879
	Saturn	E.	109 44 31	2816	108 10 24	2826	106 36 30	2836	105 2 49	2845
2	Sun	W.	23 50 21	3362	25 13 21	3363	26 36 20	3364	27 59 18	3367
	Aldebaran	E.	31 46 35	2915	30 14 35	2925	28 42 48	2936	27 11 15	2946
	Pollux	E.	76 3 56	2928	74 32 13	2938	73 0 42	2947	71 29 23	2958
	Saturn	E.	97 17 32	2894	95 45 6	2903	94 12 51	2912	92 40 48	2922
	Regulus	E.	111 54 54	2907	110 22 44	2916	108 50 46	2925	107 18 59	2934
3	Sun	W.	34 53 1	3390	36 15 29	3395	37 37 51	3400	39 0 7	3406
	Pollux	E.	63 55 47	3003	62 25 38	3012	60 55 40	3020	59 25 52	3029
	Saturn	E.	85 3 22	2964	83 32 24	2973	82 1 37	2980	80 30 59	2988
	Regulus	E.	99 42 50	2976	98 12 7	2984	96 41 34	2992	95 11 11	2999
4	Sun	W.	45 49 53	3433	47 11 32	3438	48 33 6	3442	49 54 35	3446
	Pollux	E.	51 59 26	3068	50 30 37	3076	49 1 58	3084	47 33 29	3091
	Saturn	E.	73 0 5	3022	71 30 19	3026	70 0 39	3032	68 31 6	3037
	Regulus	E.	87 41 27	3032	86 11 54	3038	84 42 28	3043	83 13 9	3048
5	Sun	W.	56 40 52	3463	58 1 57	3466	59 22 59	3468	60 43 59	3470
	Venus	W.	25 26 32	3536	26 46 16	3498	28 6 42	3465	29 27 45	3436
	Pollux	E.	40 13 12	3125	38 45 33	3133	37 18 3	3140	35 50 42	3148
	Saturn	E.	61 4 48	3058	59 35 47	3060	58 6 49	3063	56 37 54	3065
	Regulus	E.	75 47 58	3069	74 19 10	3071	72 50 25	3073	71 21 43	3076
6	Sun	W.	67 28 41	3471	68 49 38	3471	70 10 35	3469	71 31 34	3467
	Venus	W.	36 20 1	3333	37 43 34	3317	39 7 26	3302	40 31 35	3288
	Aldebaran	W.	16 28 3	3115	17 55 54	3109	19 23 53	3103	20 51 59	3097
	Pollux	E.	28 36 19	3192	27 10 0	3204	25 43 55	3218	24 18 7	3234
	Saturn	E.	49 13 49	3069	47 45 2	3069	46 16 15	3069	44 47 27	3067
	Regulus	E.	63 58 44	3080	62 30 10	3080	61 1 36	3079	59 33 1	3078
7	Sun	W.	78 17 13	3449	79 38 34	3445	81 0 0	3439	82 21 32	3433
	Venus	W.	47 36 11	3225	49 1 50	3214	50 27 43	3202	51 53 50	3190
	Aldebaran	W.	28 14 7	3071	29 42 52	3065	31 11 44	3060	32 40 43	3053
	Saturn	E.	37 22 49	3053	35 53 42	3049	34 24 30	3045	32 55 13	3040
	Regulus	E.	52 9 31	3065	50 40 39	3061	49 11 42	3056	47 42 39	3051
	Spica	E.	106 6 18	3091	104 37 57	3087	103 9 31	3081	101 40 58	3076
8	Sun	W.	89 11 5	3396	90 33 26	3387	91 55 57	3378	93 18 38	3368
	Venus	W.	59 8 2	3128	60 35 38	3115	62 3 29	3103	63 31 35	3090
	Aldebaran	W.	40 7 44	3017	41 37 36	3008	43 7 39	2998	44 37 54	2988
	Regulus	E.	40 15 44	3022	38 45 58	3014	37 16 3	3006	35 45 58	2999
	Spica	E.	94 16 21	3041	92 46 59	3033	91 17 27	3024	89 47 44	3014
9	Sun	W.	100 15 7	3312	101 39 5	3300	103 3 17	3287	104 27 44	3273
	Venus	W.	70 56 16	3019	72 26 5	3005	73 56 12	2989	75 26 38	2973
	Aldebaran	W.	52 12 18	2935	53 43 52	2924	55 15 41	2912	56 47 45	2899
	Regulus	E.	28 13 3	2957	26 41 56	2947	25 10 37	2939	23 39 8	2931
	Spica	E.	82 16 10	2964	80 45 12	2952	79 13 59	2941	77 42 32	2928

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	**Sun**	W.	18° 19′ 5″	3384	19° 41′ 40″	3373	21° 4′ 27″	3366	22° 27′ 22″	3363
	Aldebaran	E.	37 56 51	2873	36 23 57	2883	34 51 16	2894	33 18 49	2904
	Pollux	E.	82 12 52	2889	80 40 19	2899	79 7 59	2909	77 35 51	2919
	Saturn	E.	103 29 20	2855	101 56 4	2866	100 23 1	2875	98 50 10	2885
2	**Sun**	W.	29 22 12	3371	30 45 2	3375	32 7 47	3379	33 30 27	3385
	Aldebaran	E.	25 39 55	2958	24 8 49	2969	22 37 57	2981	21 7 20	2993
	Pollux	E.	69 58 17	2967	68 27 23	2976	66 56 40	2985	65 26 8	2993
	Saturn	E.	91 8 57	2931	89 37 17	2939	88 5 48	2948	86 34 30	2956
	Regulus	E.	105 47 23	2943	104 15 59	2952	102 44 46	2960	101 13 43	2968
3	**Sun**	W.	40 22 17	3412	41 44 20	3417	43 6 17	3422	44 28 8	3428
	Pollux	E.	57 56 15	3037	56 26 48	3045	54 57 31	3053	53 28 24	3060
	Saturn	E.	79 0 31	2995	77 30 12	3001	76 0 1	3009	74 29 59	3015
	Regulus	E.	93 40 57	3006	92 10 52	3013	90 40 55	3020	89 11 7	3026
4	**Sun**	W.	51 15 59	3451	52 37 18	3455	53 58 33	3458	55 19 44	3461
	Pollux	E.	46 5 9	3098	44 36 57	3105	43 8 54	3112	41 40 59	3119
	Saturn	E.	67 1 39	3042	65 32 18	3047	64 3 3	3051	62 33 53	3055
	Regulus	E.	81 43 56	3053	80 14 49	3057	78 45 47	3061	77 16 50	3065
5	**Sun**	W.	62 4 57	3471	63 25 54	3472	64 46 50	3472	66 7 45	3471
	Venus	W.	30 49 21	3411	32 11 25	3389	33 33 54	3368	34 56 47	3360
	Pollux	E.	34 23 30	3155	32 56 27	3163	31 29 33	3172	30 2 50	3182
	Saturn	E.	55 9 2	3067	53 40 12	3068	52 11 23	3069	50 42 36	3069
	Regulus	E.	69 53 4	3078	68 24 27	3079	66 55 52	3080	65 27 18	3080
6	**Sun**	W.	72 52 35	3464	74 13 39	3462	75 34 46	3458	76 55 57	3454
	Venus	W.	41 56 0	3275	43 20 41	3262	44 45 37	3250	46 10 47	3238
	Aldebaran	W.	22 20 12	3092	23 48 31	3087	25 16 57	3082	26 45 29	3077
	Pollux	E.	22 52 38	3253	21 27 31	3276	20 2 52	3306	18 38 47	3344
	Saturn	E.	43 18 37	3065	41 49 45	3063	40 20 50	3060	38 51 51	3057
	Regulus	E.	58 4 24	3075	56 35 44	3073	55 7 2	3072	53 38 18	3069
7	**Sun**	W.	83 43 11	3427	85 4 57	3420	86 26 51	3413	87 48 53	3404
	Venus	W.	53 20 11	3178	54 46 47	3166	56 13 37	3153	57 40 42	3141
	Aldebaran	W.	34 9 50	3047	35 39 5	3039	37 8 29	3032	38 38 2	3025
	Saturn	E.	31 25 50	3034	29 56 20	3029	28 26 43	3022	26 56 58	3015
	Regulus	E.	46 13 29	3046	44 44 13	3040	43 14 50	3035	41 45 21	3029
	Spica	E.	100 12 19	3069	98 43 32	3063	97 14 37	3056	95 45 33	3049
8	**Sun**	W.	94 41 31	3358	96 4 36	3347	97 27 53	3336	98 51 23	3324
	Venus	W.	64 59 57	3076	66 28 36	3062	67 57 32	3048	69 26 45	3034
	Aldebaran	W.	46 8 22	2978	47 39 2	2969	49 9 54	2958	50 40 59	2947
	Regulus	E.	34 15 44	2991	32 45 20	2982	31 14 45	2973	29 43 59	2965
	Spica	E.	88 17 49	3005	86 47 43	2996	85 17 25	2985	83 46 54	2975
9	**Sun**	W.	105 52 27	3259	107 17 26	3245	108 42 42	3231	110 8 15	3216
	Venus	W.	76 57 24	2958	78 28 29	2942	79 59 54	2927	81 31 39	2910
	Aldebaran	W.	58 20 5	2886	59 52 42	2873	61 25 36	2859	62 58 48	2845
	Regulus	E.	22 7 28	2923	20 35 38	2916	19 3 40	2912	17 31 36	2909
	Spica	E.	76 10 49	2916	74 38 51	2903	73 6 36	2891	71 34 5	2877

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
10	Sun	W.	111° 34′ 5″	3201	113° 0′ 13″	3185	114° 26′ 40″	3170	115° 53′ 25″	3153
	Venus	W.	83 3 45	2894	84 36 12	2877	86 9 0	2861	87 42 9	2844
	Aldebaran	W.	64 32 18	2830	66 6 7	2815	67 40 15	2801	69 14 42	2785
	Pollux	W.	21 6 50	3016	22 36 43	2977	24 7 24	2943	25 38 48	2912
	Spica	E.	70 1 17	2864	68 28 12	2850	66 54 49	2836	65 21 8	2821
	Antares	E.	115 54 49	2874	114 21 57	2858	112 48 44	2842	111 15 10	2825
11	Sun	W.	123 12 8	3070	124 40 54	3053	126 10 1	3036	127 39 29	3019
	Venus	W.	95 33 31	2756	97 8 56	2739	98 44 44	2721	100 20 56	2704
	Aldebaran	W.	77 12 5	2706	78 48 37	2689	80 25 32	2672	82 2 49	2655
	Pollux	W.	33 24 53	2783	34 59 43	2760	36 35 3	2738	38 10 53	2716
	Spica	E.	57 28 1	2749	55 52 26	2735	54 16 32	2719	52 40 18	2705
	Antares	E.	103 22 1	2743	101 46 18	2725	100 10 12	2708	98 33 43	2691
12	Aldebaran	W.	90 15 1	2569	91 54 38	2553	93 34 38	2535	95 15 2	2518
	Pollux	W.	46 17 7	2613	47 55 44	2593	49 34 48	2574	51 14 19	2555
	Saturn	W.	24 48 13	2569	26 27 50	2551	28 7 52	2534	29 48 18	2517
	Spica	E.	44 34 22	2635	42 56 15	2623	41 17 51	2610	39 39 10	2599
	Antares	E.	90 25 30	2604	88 46 41	2588	87 7 29	2570	85 27 53	2553
13	Pollux	W.	59 38 23	2463	61 20 28	2445	63 2 58	2428	64 45 53	2411
	Saturn	W.	38 16 29	2431	39 59 19	2415	41 42 33	2398	43 26 10	2382
	Regulus	W.	23 39 2	2462	25 21 8	2443	27 3 42	2423	28 46 44	2404
	Antares	E.	77 4 5	2471	75 22 11	2455	73 39 54	2439	71 57 15	2424
	Jupiter	E.	106 22 57	2441	104 40 20	2424	102 57 20	2408	101 13 57	2392
14	Pollux	W.	73 26 20	2332	75 11 33	2317	76 57 7	2303	78 43 2	2289
	Saturn	W.	52 9 54	2307	53 55 44	2292	55 41 55	2279	57 28 26	2265
	Regulus	W.	37 28 20	2320	39 13 51	2304	40 59 44	2289	42 45 59	2276
	Antares	E.	63 18 45	2354	61 34 4	2342	59 49 5	2329	58 3 48	2318
	Jupiter	E.	92 31 20	2315	90 45 43	2300	88 59 44	2287	87 13 25	2273
	α Aquilæ	E.	108 41 20	3029	107 11 43	3001	105 41 31	2975	104 10 47	2950
15	Pollux	W.	87 37 26	2228	89 25 12	2218	91 13 13	2208	93 1 29	2198
	Saturn	W.	66 25 46	2204	68 14 7	2194	70 2 43	2184	71 51 34	2174
	Regulus	W.	51 42 11	2212	53 30 20	2201	55 18 46	2190	57 7 28	2181
	Antares	E.	49 13 37	2272	47 26 57	2266	45 40 7	2260	43 53 9	2256
	Jupiter	E.	78 17 2	2212	76 28 53	2202	74 40 28	2191	72 51 47	2181
	α Aquilæ	E.	96 30 9	2855	94 56 53	2842	93 23 19	2829	91 49 29	2818
16	Saturn	W.	80 59 8	2136	82 49 12	2130	84 39 26	2124	86 29 48	2120
	Regulus	W.	66 14 20	2141	68 4 17	2134	69 54 24	2129	71 44 39	2124
	Antares	E.	34 57 27	2258	33 10 25	2264	31 23 33	2274	29 36 56	2288
	Jupiter	E.	63 45 1	2141	61 55 5	2136	60 5 0	2130	58 14 46	2125
	α Aquilæ	E.	83 57 30	2790	82 22 49	2789	80 48 7	2791	79 13 27	2795
17	Saturn	W.	95 43 10	2104	97 34 3	2103	99 24 57	2103	101 15 52	2103
	Regulus	W.	80 57 33	2108	82 48 20	2107	84 39 9	2105	86 30 0	2105
	Spica	W.	27 39 0	2249	29 26 14	2232	31 13 51	2218	33 1 54	2207
	Jupiter	E.	49 2 2	2109	47 11 16	2107	45 20 28	2107	43 29 39	2107
	α Aquilæ	E.	71 22 10	2844	69 48 39	2860	68 15 29	2879	66 42 43	2901
	Fomalhaut	E.	103 39 18	2316	101 53 42	2313	100 8 1	2309	98 22 15	2307

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
10	Sun	W.	117° 20′ 30″	3138	118° 47′ 54″	3121	120° 15′ 38″	3104	121° 43′ 43″	3087
	Venus	W.	89 15 40	2826	90 49 34	2809	92 23 50	2792	93 58 29	2774
	Aldebaran	W.	70 49 29	2769	72 24 37	2753	74 0 6	2738	75 35 55	2722
	Pollux	W.	27 10 51	2883	28 43 31	2856	30 16 46	2831	31 50 34	2807
	Spica	E.	63 47 8	2808	62 12 50	2793	60 38 13	2779	59 3 17	2763
	Antares	E.	109 41 15	2809	108 6 59	2792	106 32 21	2776	104 57 22	2760
11	Sun	W.	129 9 18	3001	130 39 29	2985	132 10 1	2968	133 40 54	2950
	Venus	W.	101 57 31	2687	103 34 29	2669	105 11 51	2652	106 49 36	2634
	Aldebaran	W.	83 40 29	2638	85 18 32	2621	86 56 58	2604	88 35 48	2587
	Pollux	W.	39 47 12	2695	41 23 59	2674	43 1 14	2653	44 38 57	2633
	Spica	E.	51 3 45	2691	49 26 53	2676	47 49 41	2663	46 12 11	2649
	Antares	E.	96 56 51	2674	95 19 36	2656	93 41 57	2639	92 3 55	2622
12	Aldebaran	W.	96 55 50	2501	98 37 2	2484	100 18 38	2467	102 0 38	2450
	Pollux	W.	52 54 16	2536	54 34 39	2517	56 15 28	2499	57 56 43	2481
	Saturn	W.	31 29 8	2499	33 10 22	2482	34 52 0	2465	36 34 2	2448
	Spica	E.	38 0 13	2588	36 21 2	2579	34 41 38	2571	33 2 3	2565
	Antares	E.	83 47 54	2537	82 7 32	2520	80 26 46	2503	78 45 37	2487
13	Pollux	W.	66 29 12	2395	68 12 54	2378	69 57 0	2362	71 41 29	2347
	Saturn	W.	45 10 10	2366	46 54 33	2351	48 39 18	2336	50 24 25	2321
	Regulus	W.	30 30 13	2386	32 14 8	2368	33 58 28	2352	35 43 12	2335
	Antares	E.	70 14 14	2409	68 30 52	2395	66 47 10	2380	65 3 7	2367
	Jupiter	E.	99 30 11	2376	97 46 2	2360	96 1 30	2345	94 16 36	2330
14	Pollux	W.	80 29 17	2277	82 15 51	2264	84 2 44	2251	85 49 56	2239
	Saturn	W.	59 15 17	2252	61 2 27	2239	62 49 56	2228	64 37 42	2216
	Regulus	W.	44 32 34	2262	46 19 30	2249	48 6 45	2236	49 54 19	2224
	Antares	E.	56 18 15	2307	54 32 26	2298	52 46 23	2288	51 0 6	2280
	Jupiter	E.	85 26 46	2260	83 39 47	2247	81 52 30	2235	80 4 55	2223
	α Aquilæ	E.	102 39 32	2928	101 7 49	2907	99 35 39	2888	98 3 5	2871
15	Pollux	W.	94 50 0	2189	96 38 44	2181	98 27 40	2173	100 16 48	2166
	Saturn	W.	73 40 40	2166	75 29 59	2157	77 19 31	2150	79 9 14	2143
	Regulus	W.	58 56 24	2172	60 45 34	2163	62 34 57	2155	64 24 33	2147
	Antares	E.	42 6 5	2253	40 18 57	2251	38 31 46	2251	36 44 35	2253
	Jupiter	E.	71 2 51	2172	69 13 42	2164	67 24 20	2156	65 34 46	2149
	α Aquilæ	E.	90 15 24	2808	88 41 7	2801	87 6 41	2796	85 32 8	2792
16	Saturn	W.	88 20 17	2115	90 10 53	2112	92 1 34	2109	93 52 20	2106
	Regulus	W.	73 35 2	2119	75 25 32	2115	77 16 8	2112	79 6 49	2110
	Antares	E.	27 50 39	2306	26 4 48	2328	24 19 30	2359	22 34 56	2398
	Jupiter	E.	56 24 25	2120	54 33 57	2116	52 43 23	2114	50 52 45	2111
	α Aquilæ	E.	77 38 52	2800	76 4 24	2808	74 30 6	2817	72 56 0	2829
17	Saturn	W.	103 6 47	2103	104 57 41	2104	106 48 34	2106	108 39 24	2108
	Regulus	W.	88 20 51	2106	90 11 41	2107	92 2 29	2109	93 53 15	2111
	Spica	W.	34 50 11	2198	36 38 42	2191	38 27 23	2186	40 16 12	2182
	Jupiter	E.	41 38 50	2107	39 48 1	2108	37 57 14	2109	36 6 29	2111
	α Aquilæ	E.	65 10 25	2926	63 38 39	2954	62 7 29	2986	60 36 59	3022
	Fomalhaut	E.	96 36 26	2306	94 50 35	2306	93 4 44	2307	91 18 54	2309

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L of Diff.
			° ′ ″		° ′ ″		° ′ ″		° ′ ″	
18	Spica	W.	42 5 7	2179	43 54 6	2178	45 43 7	2178	47 32 8	2178
	Jupiter	E.	34 15 47	2114	32 25 9	2117	30 34 36	2120	28 44 8	2125
	α Aquilæ	E.	59 7 13	3060	57 38 15	3104	56 10 10	3152	54 43 3	3204
	Fomalhaut	E.	89 33 7	2311	87 47 24	2315	86 1 46	2320	84 16 15	2325
	α Pegasi	E.	105 39 10	2532	103 58 41	2528	102 18 7	2526	100 37 30	2525
19	Spica	W.	56 36 35	2194	58 25 12	2198	60 13 42	2204	62 2 3	2210
	Fomalhaut	E.	75 31 7	2366	73 46 43	2377	72 2 35	2389	70 18 45	2403
	α Pegasi	E.	92 14 47	2541	90 34 31	2548	88 54 24	2556	87 14 28	2564
	Sun	E.	130 48 24	2475	129 6 35	2481	127 24 55	2488	125 43 25	2495
20	Spica	W.	71 1 15	2249	72 48 30	2258	74 35 32	2266	76 22 21	2276
	Antares	W.	25 38 32	2411	27 21 51	2397	29 5 30	2388	30 49 22	2382
	Fomalhaut	E.	61 44 38	2482	60 2 59	2501	58 21 47	2522	56 41 4	2544
	α Pegasi	E.	78 58 22	2625	77 20 1	2640	75 42 1	2657	74 4 24	2675
	Sun	E.	117 18 34	2537	115 38 12	2547	113 58 4	2556	112 18 9	2566
21	Spica	W.	85 12 50	2327	86 58 10	2337	88 43 15	2348	90 28 4	2359
	Antares	W.	39 29 37	2386	41 13 32	2390	42 57 21	2396	44 41 2	2401
	Fomalhaut	E.	48 25 53	2681	46 48 47	2715	45 12 27	2752	43 36 56	2792
	α Pegasi	E.	66 2 43	2782	64 27 51	2807	62 53 32	2835	61 19 49	2863
	Sun	E.	104 2 10	2621	102 23 43	2632	100 45 32	2644	99 7 37	2655
22	Spica	W.	99 8 5	2417	100 51 16	2429	102 34 10	2441	104 16 47	2452
	Antares	W.	53 16 58	2441	54 59 34	2450	56 41 58	2459	58 24 9	2468
	Jupiter	W.	23 17 27	2386	25 1 22	2396	26 45 2	2408	28 28 26	2419
	α Pegasi	E.	53 41 16	3039	52 11 51	3082	50 43 19	3128	49 15 43	3178
	Sun	E.	91 1 58	2715	89 25 38	2728	87 49 35	2740	86 13 48	2752
23	Antares	W.	66 51 42	2517	68 32 31	2527	70 13 6	2538	71 53 27	2547
	Jupiter	W.	37 1 28	2475	38 43 17	2485	40 24 51	2496	42 6 10	2507
	α Aquilæ	W.	34 56 3	5669	35 44 51	5407	36 36 41	5179	37 31 18	4981
	Sun	E.	78 18 52	2812	76 44 40	2825	75 10 44	2837	73 37 4	2848
24	Antares	W.	80 11 45	2599	81 50 42	2608	83 29 26	2618	85 7 56	2628
	Jupiter	W.	50 29 1	2559	52 8 52	2570	53 48 28	2580	55 27 50	2590
	α Aquilæ	W.	42 38 35	4294	43 45 33	4199	44 54 0	4115	46 3 47	4041
	Sun	E.	65 52 32	2908	64 20 23	2919	62 48 28	2931	61 16 48	2942
25	Antares	W.	93 17 5	2678	94 54 15	2688	96 31 11	2698	98 7 54	2707
	Jupiter	W.	63 41 18	2639	65 19 20	2649	66 57 9	2658	68 34 45	2667
	α Aquilæ	W.	52 8 38	3773	53 24 8	3735	54 40 18	3702	55 57 3	3672
	Sun	E.	53 42 5	3000	52 11 52	3010	50 41 52	3022	49 12 6	3033
26	Jupiter	W.	76 39 41	2713	78 16 4	2722	79 52 15	2730	81 28 15	2738
	α Aquilæ	W.	62 27 45	3565	63 46 57	3551	65 6 25	3538	66 26 7	3528
	Sun	E.	41 46 45	3090	40 18 23	3101	38 50 15	3113	37 22 21	3125
27	Jupiter	W.	89 25 27	2781	91 0 20	2788	92 35 3	2797	94 9 35	2805
	α Aquilæ	W.	73 6 57	3497	74 27 25	3495	75 47 55	3493	77 8 27	3492
	Fomalhaut	W.	37 53 12	3348	39 16 28	3319	40 40 17	3294	42 4 35	3274
	Sun	E.	30 6 37	3190	28 40 16	3204	27 14 12	3220	25 48 26	3236

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XV$^{\text{h}}$.	P. L. of Diff.	XVIII$^{\text{h}}$.	P. L. of Diff.	XXI$^{\text{h}}$.	P. L. of Diff.
18	Spica	W.	49° 21′ 8″	2180	51° 10′ 6″	2182	52° 59′ 1″	2185	54° 47′ 51″	2189
	JUPITER	E.	26 53 47	2130	25 3 33	2134	23 13 26	2140	21 23 28	2147
	α Aquilæ	E.	53 16 59	3363	51 52 4	3328	50 28 25	3400	49 6 9	3480
	Fomalhaut	E.	82 30 52	2332	80 45 39	2339	79 0 36	2347	77 15 45	2356
	α Pegasi	E.	98 56 52	2526	97 16 15	2528	95 35 41	2531	93 55 11	2535
19	Spica	W.	63 50 15	2217	65 38 17	2225	67 26 8	2232	69 13 48	2241
	Fomalhaut	E.	68 35 14	2416	66 52 2	2431	65 9 11	2447	63 26 43	2463
	α Pegasi	E.	85 34 44	2574	83 55 14	2586	82 16 0	2598	80 37 2	2611
	SUN	E.	124 2 5	2502	122 20 55	2510	120 39 56	2519	118 59 9	2528
20	Spica	W.	78 8 56	2285	79 55 17	2296	81 41 23	2306	83 27 14	2316
	Antares	W.	32 33 22	2379	34 17 27	2378	36 1 33	2380	37 45 37	2382
	Fomalhaut	E.	55 0 52	2568	53 21 13	2593	51 42 8	2621	50 3 41	2649
	α Pegasi	E.	72 27 10	2693	70 50 21	2713	69 13 59	2735	67 38 6	2758
	SUN	E.	110 38 28	2577	108 59 1	2588	107 19 49	2599	105 40 52	2610
21	Spica	W.	92 12 37	2371	93 56 54	2382	95 40 54	2394	97 24 38	2405
	Antares	W.	46 24 35	2408	48 7 58	2416	49 51 10	2424	51 34 10	2433
	Fomalhaut	E.	42 2 17	2835	40 28 35	2883	38 55 55	2937	37 24 23	2997
	α Pegasi	E.	59 46 43	2894	58 14 16	2927	56 42 31	2962	55 11 30	2999
	SUN	E.	97 29 57	2667	95 52 33	2679	94 15 25	2691	92 38 33	2704
22	Spica	W.	105 59 8	2464	107 41 12	2476	109 22 59	2488	111 4 29	2500
	Antares	W.	60 6 7	2478	61 47 51	2487	63 29 22	2497	65 10 39	2507
	JUPITER	W.	30 11 34	2430	31 54 26	2441	33 37 2	2452	35 19 23	2463
	α Pegasi	E.	47 49 8	3232	46 23 37	3290	44 59 14	3354	43 36 5	3425
	SUN	E.	84 38 17	2764	83 3 2	2776	81 28 3	2788	79 53 20	2800
23	Antares	W.	73 33 35	2557	75 13 29	2567	76 53 9	2578	78 32 34	2588
	JUPITER	W.	43 47 14	2517	45 28 3	2528	47 8 37	2539	48 48 56	2549
	α Aquilæ	W.	38 28 28	4808	39 27 58	4653	40 29 37	4518	41 33 13	4399
	SUN	E.	72 3 39	2860	70 30 29	2873	68 57 35	2884	67 24 56	2896
24	Antares	W.	86 46 13	2638	88 24 16	2648	90 2 6	2658	91 39 42	2668
	JUPITER	W.	57 6 59	2600	58 45 54	2610	60 24 35	2620	62 3 3	2629
	α Aquilæ	W.	47 14 46	3975	48 26 50	3916	49 39 54	3862	50 53 52	3816
	SUN	E.	59 45 23	2954	58 14 12	2965	56 43 15	2977	55 12 33	2988
25	Antares	W.	99 44 25	2716	101 20 43	2726	102 56 48	2736	104 32 40	2747
	JUPITER	W.	70 12 9	2677	71 49 20	2686	73 26 19	2695	75 3 6	2704
	α Aquilæ	W.	57 14 20	3645	58 32 6	3622	59 50 17	3600	61 8 51	3582
	SUN	E.	47 42 34	3044	46 13 16	3056	44 44 12	3067	43 15 22	3078
26	JUPITER	W.	83 4 4	2747	84 39 42	2756	86 15 8	2764	87 50 23	2772
	α Aquilæ	W.	67 46 0	3519	69 6 3	3511	70 26 15	3506	71 46 33	3500
	SUN	E.	35 54 42	3138	34 27 18	3150	33 0 9	3163	31 33 15	3176
27	JUPITER	W.	95 43 56	2813	97 18 7	2821	98 52 8	2828	100 25 59	2836
	α Aquilæ	W.	78 29 0	3493	79 49 32	3494	81 10 3	3497	82 30 31	3500
	Fomalhaut	W.	43 29 17	3256	44 54 20	3240	46 19 42	3226	47 45 20	3214
	SUN	E.	24 23 0	3254	22 57 55	3274	21 33 13	3295	20 8 56	3320

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Wed.	1	2 35 21.21	9.554	N.15 13 11.8	+45.10	15 54.08	66.10	3 3.31	0.301
Thur.	2	2 39 10.78	9.577	15 31 6.5	44.46	15 53.85	66.18	3 10.27	0.278
Frid.	3	2 43 0.89	9.599	15 48 45.8	43.81	15 53.62	66.26	3 16.69	0.256
Sat.	4	2 46 51.55	9.622	16 6 9.3	+43.15	15 53.40	66.35	3 22.58	0.233
SUN.	5	2 50 42.75	9.644	16 23 16.9	42.47	15 53.18	66.43	3 27.92	0.211
Mon.	6	2 54 34.50	9.667	16 40 8.1	41.78	15 52.96	66.51	3 32.72	0.188
Tues.	7	2 58 26.80	9.690	16 56 42.5	+41.08	15 52.74	66.59	3 36.97	0.165
Wed.	8	3 2 19.65	9.714	17 13 0.0	40.37	15 52.53	66.67	3 40.66	0.142
Thur.	9	3 6 13.06	9.737	17 29 0.2	39.64	15 52.32	66.75	3 43.79	0.118
Frid.	10	3 10 7.02	9.761	17 44 42.8	+38.90	15 52.12	66.83	3 46.38	0.095
Sat.	11	3 14 1.54	9.784	18 0 7.5	38.15	15 51.91	66.91	3 48.41	0.072
SUN.	12	3 17 56.64	9.808	18 15 14.0	37.39	15 51.71	66.99	3 49.87	0.048
Mon.	13	3 21 52.31	9.831	18 30 2.1	+36.62	15 51.51	67.07	3 50.76	0.025
Tues.	14	3 25 48.54	9.855	18 44 31.6	35.83	15 51.31	67.15	3 51.08	0.001
Wed.	15	3 29 45.34	9.878	18 58 42.1	35.04	15 51.11	67.23	3 50.84	0.022
Thur.	16	3 33 42.70	9.902	19 12 33.4	+34.23	15 50.92	67.32	3 50.03	0.046
Frid.	17	3 37 40.64	9.926	19 26 5.2	33.42	15 50.73	67.40	3 48.65	0.070
Sat.	18	3 41 39.16	9.950	19 39 17.3	32.59	15 50.54	67.48	3 46.70	0.094
SUN.	19	3 45 38.24	9.974	19 52 9.5	+31.75	15 50.35	67.56	3 44.18	0.118
Mon.	20	3 49 37.88	9.997	20 4 41.5	30.90	15 50.16	67.63	3 41.10	0.141
Tues.	21	3 53 38.09	10.020	20 16 53.0	30.04	15 49.98	67.71	3 37.46	0.164
Wed.	22	3 57 38.85	10.044	20 28 43.7	+29.17	15 49.80	67.78	3 33.27	0.187
Thur.	23	4 1 40.15	10.066	20 40 13.5	28.30	15 49.62	67.86	3 28.53	0.209
Frid.	24	4 5 41.99	10.088	20 51 22.2	27.41	15 49.45	67.93	3 23.26	0.231
Sat.	25	4 9 44.35	10.110	21 2 9.5	+26.51	15 49.28	68.00	3 17.47	0.253
SUN.	26	4 13 47.23	10.131	21 12 35.1	25.61	15 49.12	68.07	3 11.16	0.274
Mon.	27	4 17 50.60	10.151	21 22 38.8	24.70	15 48.96	68.14	3 4.37	0.294
Tues.	28	4 21 54.45	10.170	21 32 20.5	+23.77	15 48.81	68.20	2 57.10	0.313
Wed.	29	4 25 58.76	10.189	21 41 39.8	22.83	15 48.66	68.26	2 49.37	0.332
Thur.	30	4 30 3.52	10.207	21 50 36.5	21.88	15 48.52	68.32	2 41.19	0.350
Frid.	31	4 34 8.70	10.224	21 59 10.5	20 93	15 48.38	68.38	2 32.59	0.367
Sat.	32	4 38 14.28	10.241	N.22 7 21.5	+19.97	15 48.24	68.44	2 23.58	0.384

NOTE.—The mean time of semidiameter passing may be found by subtracting 0s.18 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	s	m s	s	h m s
Wed.	1	2 35 21.70	9.555	N. 15 13 14.0	+45.10	3 3.33	0.301	2 38 25.03
Thur.	2	2 39 11.29	9.578	15 31 8.8	44.46	3 10.29	0.278	2 42 21.58
Frid.	3	2 43 1.42	9.600	15 48 48.1	43.81	3 16.71	0.256	2 46 18.13
Sat.	4	2 46 52.10	9.623	16 6 11.7	+43.15	3 22.59	0.233	2 50 14.69
SUN.	5	2 50 43.31	9.645	16 23 19.3	42.47	3 27.93	0.211	2 54 11.24
Mon.	6	2 54 35.07	9.668	16 40 10.5	41.78	3 32.73	0.188	2 58 7.80
Tues.	7	2 58 27.38	9.691	16 56 44.9	+41.08	3 36.98	0.165	3 2 4.36
Wed.	8	3 2 20.25	9.714	17 13 2.4	40.37	3 40.67	0.142	3 6 0.92
Thur.	9	3 6 13.67	9.737	17 29 2.6	39.64	3 43.80	0.118	3 9 57.47
Frid.	10	3 10 7.64	9.761	17 44 45.2	+38.90	3 46.39	0.095	3 13 54.03
Sat.	11	3 14 2.17	9.784	18 0 9.9	38.15	3 48.42	0.072	3 17 50.59
SUN.	12	3 17 57.27	9.808	18 15 16.4	37.39	3 49.87	0.048	3 21 47.14
Mon.	13	3 21 52.94	9.831	18 30 4.5	+36.62	3 50.76	0.025	3 25 43.70
Tues.	14	3 25 49.17	9.855	18 44 33.9	35.83	3 51.08	0.001	3 29 40.25
Wed.	15	3 29 45.97	9.878	18 58 44.4	35.04	3 50.84	0.022	3 33 36.81
Thur.	16	3 33 43.33	9.902	19 12 35.6	+34.23	3 50.03	0.046	3 37 33.36
Frid.	17	3 37 41.27	9.926	19 26 7.3	33.42	3 48.65	0.070	3 41 29.92
Sat.	18	3 41 39.78	9.950	19 39 19.4	32.59	3 46.69	0.094	3 45 26.47
SUN.	19	3 45 38.86	9.974	19 52 11.5	+31.75	3 44.17	0.118	3 49 23.03
Mon.	20	3 49 38.49	9.997	20 4 43.4	30.90	3 41.09	0.141	3 53 19.58
Tues.	21	3 53 38.69	10.020	20 16 54.8	30.04	3 37.45	0.164	3 57 16.14
Wed.	22	3 57 39.44	10.043	20 28 45.5	+29.17	3 33.26	0.187	4 1 12.70
Thur.	23	4 1 40.73	10.065	20 40 15.3	28.30	3 28.52	0.209	4 5 9.25
Frid.	24	4 5 42.56	10.087	20 51 23.8	27.41	3 23.25	0.231	4 9 5.81
Sat.	25	4 9 44.91	10.109	21 2 11.0	+26.51	3 17.46	0.253	4 13 2.37
SUN.	26	4 13 47.77	10.130	21 12 36.5	25.61	3 11.15	0.274	4 16 58.92
Mon.	27	4 17 51.12	10.150	21 22 40.1	24.70	3 4.36	0.294	4 20 55.48
Tues.	28	4 21 54.95	10.169	21 32 21.7	+23.77	2 57.09	0.313	4 24 52.04
Wed.	29	4 25 59.24	10.188	21 41 40.9	22.83	2 49.36	0.332	4 28 48.60
Thur.	30	4 30 3.97	10.206	21 50 37.5	21.88	2 41.18	0.350	4 32 45.15
Frid.	31	4 34 9.13	10.223	21 59 11.4	20.93	2 32.58	0.367	4 36 41.71
Sat.	32	4 38 14.70	10.240	N. 22 7 22.3	+19.97	2 23.57	0.384	4 40 38.27

Note.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

Diff. for 1 Hour,
$+ 9^{s}.8565$.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		λ	λ′					
		° ′ ″	′ ″	″	″			h m s
1	121	41 16 43.4	16 44.8	145.47	− 0.50	0.0035889	+44.4	21 18 5.00
2	122	42 14 53.7	14 55.0	145.39	0.41	0.0036946	43.7	21 14 9.10
3	123	43 13 2.2	13 3.4	145.31	0.30	0.0037985	43.0	21 10 13.20
4	124	44 11 8.8	11 9.9	145.23	− 0.18	0.0039008	+42.3	21 6 17.29
5	125	45 9 13.5	9 14.5	145.15	− 0.04	0.0040016	41.7	21 2 21.38
6	126	46 7 16.3	7 17.1	145.07	+ 0.09	0.0041009	41.1	20 58 25.47
7	127	47 5 17.1	5 17.8	144.99	+ 0.21	0.0041988	+40.5	20 54 29.56
8	128	48 3 16.1	3 16.7	144.92	0.31	0.0042954	40.0	20 50 33.65
9	129	49 1 13.2	1 13.6	144.84	0 39	0.0043908	39.5	20 46 37.74
10	130	49 59 8.5	59 8.7	144.77	+ 0.45	0.0044852	+39.1	20 42 41.83
11	131	50 57 2.1	57 2.2	144.70	0.48	0.0045786	38.7	20 38 45.92
12	132	51 54 54.0	54 54.0	144.63	0.48	0.0046711	38.4	20 34 50.01
13	133	52 52 44.2	52 44.1	144.56	+ 0.45	0.0047627	+38.0	20 30 54.10
14	134	53 50 32.9	50 32.6	144.50	0.39	0.0048534	37.6	20 26 58.19
15	135	54 48 20.1	48 19.6	144.44	0.30	0.0049433	37.2	20 23 2.28
16	136	55 46 5.8	46 5.2	144.38	+ 0.18	0.0050323	+36.9	20 19 6.37
17	137	56 43 50.3	43 49.6	144.33	+ 0.06	0.0051204	36.5	20 15 10.46
18	138	57 41 33.6	41 32.7	144.28	− 0.08	0.0052075	36.1	20 11 14.55
19	139	58 39 15.7	39 14.6	144.24	− 0.21	0.0052936	+35.6	20 7 18.64
20	140	59 36 56.7	36 55.4	144.19	0.34	0.0053785	35.1	20 3 22.73
21	141	60 34 36.7	34 35.3	144.14	0.46	0.0054621	34.5	19 59 26.82
22	142	61 32 15.7	32 14.2	144.10	− 0.56	0.0055442	+33.9	19 55 30.91
23	143	62 29 53.7	29 52.0	144.06	0.64	0.0056247	33.2	19 51 35.00
24	144	63 27 30.7	27 28.8	144.02	0.70	0.0057034	32.4	19 47 39.09
25	145	64 25 6.7	25 4.6	143.98	− 0.72	0.0057801	+31.6	19 43 43.18
26	146	65 22 41.8	22 39.6	143.94	0.70	0.0058548	30.7	19 39 47 27
27	147	66 20 16.0	20 13.7	143.89	0.66	0.0059274	29.8	19 35 51.35
28	148	67 17 49.3	17 46.8	143.85	− 0.60	0.0059978	+28.8	19 31 55.44
29	149	68 15 21.6	15 18.8	143.80	0.51	0.0060658	27.8	19 27 59.53
30	150	69 12 52.7	12 49.8	143.76	0.39	0.0061313	26.8	19 24 3.62
31	151	70 10 22.8	10 19.8	143.72	0.27	0.0061944	25.9	19 20 7.71
32	152	71 7 51.8	7 48.7	143.68	− 0.14	0.0062552	+24.9	19 16 11.81

Note.—The numbers in column λ correspond to the true equinox of the date; in column λ′, to the mean equinox of January $0^{d}.0$.

Diff. for 1 Hour,
$-9^{s}.8296$.
(Table II.)

GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	14 50.5	14 48.7	54 21.4	−0.61	54 14.7	−0.50	1 6.1	1.89	1.4
2	14 47.3	14 46.2	54 9.3	0.38	54 5.5	−0.25	1 52.1	1.95	2.4
3	14 45.6	14 45.5	54 3.3	−0.11	54 2.9	+0.05	2 39.4	2.00	3.4
4	14 45.9	14 46.9	54 4.5	+0.22	54 8.1	+0.39	3 27.8	2.03	4.4
5	14 48.5	14 50.7	54 13.9	0.58	54 22.0	0.77	4 16.8	2.05	5.4
6	14 53.5	14 57.0	54 32.4	0.97	54 45.2	1.17	5 5.9	2.04	6.4
7	15 1.2	15 6.0	55 0.5	+1.37	55 18.1	+1.56	5 54.7	2.02	7.4
8	15 11.4	15 17.4	55 38.0	1.75	56 0.0	1.92	6 43.0	2.00	8.4
9	15 23.9	15 30.9	56 24.0	2.07	56 49.7	2.20	7 30.8	1.99	9.4
10	15 38.3	15 45.9	57 16.8	+2.30	57 44.8	+2.35	8 18.6	2.00	10.4
11	15 53.7	16 1.4	58 13.2	2.36	58 41.5	2.33	9 6.9	2.04	11.4
12	16 8.9	16 16.0	59 9.1	2.24	59 35.2	2.09	9 56.6	2.12	12.4
13	16 22.5	16 28.3	59 59.2	+1.88	60 20.4	+1.62	10 48.8	2.23	13.4
14	16 33.1	16 36.9	60 38.2	1.32	60 52.1	0.98	11 44.0	2.38	14.4
15	16 39.5	16 40.9	61 1.7	+0.61	61 6.7	+0.22	12 42.7	2.52	15.4
16	16 41.0	16 39.8	61 7.0	−0.17	61 2.6	−0.55	13 44.4	2.62	16.4
17	16 37.4	16 34.0	60 53.9	0.89	60 41.3	1.20	14 47.6	2.63	17.4
18	16 29.6	16 24.4	60 25.2	1.46	60 6.2	1.68	15 49.9	2.55	18.4
19	16 18.6	16 12.3	59 44.8	−1.85	59 21.8	−1.96	16 49.5	2.40	19.4
20	16 5.8	15 59.1	58 57.7	2.03	58 33.1	2.05	17 45.0	2.22	20.4
21	15 52.4	15 45.7	58 8.4	2.04	57 44.1	2.00	18 36.4	2.06	21.4
22	15 39.3	15 33.1	57 20.4	−1.93	56 57.7	−1.84	19 24.3	1.93	22.4
23	15 27.2	15 21.7	56 36.2	1.74	56 15.9	1.63	20 9.6	1.84	23.4
24	15 16.6	15 11.8	55 57.0	1.51	55 39.6	1.39	20 53.2	1.80	24.4
25	15 7.5	15 3.5	55 23.6	−1.27	55 9.1	−1.15	21 36.2	1.79	25.4
26	15 0.0	14 56.8	54 56.0	1.03	54 44.3	0.92	22 19.4	1.81	26.4
27	14 53.9	14 51.5	54 33.9	0.81	54 24.9	0.70	23 3.5	1.86	27.4
28	14 49.4	14 47.6	54 17.1	−0.60	54 10.6	−0.49	23 48.9	1.92	28.4
29	14 46.2	14 45.1	54 5.3	0.39	54 1.3	0.28	☌		29.4
30	14 44.3	14 44.0	53 58.6	−0.17	53 57.3	−0.05	0 35.7	1.98	0.8
31	14 44.0	14 44.4	53 57.4	+0.07	53 59.0	+0.20	1 23.7	2.03	1.8
32	14 45.3	14 46.6	54 2.1	+0.33	54 6.9	+0.47	2 12.6	2.05	2.8

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	WEDNESDAY 1.					**FRIDAY 3.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	3 42 28.34	1.9953	N.15 53 56.5	8.519	0	5 20 35.29	2.0912	N.21 9 9.4	4.423
1	3 44 28.12	1.9972	16 2 25.0	8.439	1	5 22 40.82	2.0930	21 13 31.9	4.326
2	3 46 28.01	1.9992	16 10 49.2	8.366	2	5 24 46.45	2.0947	21 17 48.5	4.229
3	3 48 28.02	2.0012	16 19 9.0	8.293	3	5 26 52.18	2.0964	21 21 59.3	4.131
4	3 50 28.15	2.0032	16 27 24.4	8.219	4	5 28 58.01	2.0981	21 26 4.2	4.032
5	3 52 28.40	2.0052	16 35 35.3	8.145	5	5 31 3.95	2.0998	21 30 3.2	3.934
6	3 54 28.78	2.0073	16 43 41.8	8.070	6	5 33 9.99	2.1015	21 33 56.3	3.835
7	3 56 29.28	2.0093	16 51 43.7	7.994	7	5 35 16.13	2.1031	21 37 43.4	3.736
8	3 58 29.90	2.0113	16 59 41.0	7.918	8	5 37 22.36	2.1046	21 41 24.6	3.637
9	4 0 30.64	2.0133	17 7 33.8	7.841	9	5 39 28.68	2.1061	21 44 59.9	3.538
10	4 2 31.50	2.0154	17 15 21.9	7.763	10	5 41 35.09	2.1077	21 48 29.2	3.438
11	4 4 32.49	2.0175	17 23 5.3	7.684	11	5 43 41.60	2.1092	21 51 52.4	3.337
12	4 6 33.60	2.0196	17 30 44.0	7.605	12	5 45 48.20	2.1107	21 55 9.6	3.236
13	4 8 34.84	2.0217	17 38 17.9	7.526	13	5 47 54.89	2.1122	21 58 20.7	3.135
14	4 10 36.20	2.0237	17 45 47.1	7.447	14	5 50 1.66	2.1136	22 1 25.8	3.034
15	4 12 37.68	2.0258	17 53 11.5	7.366	15	5 52 8.52	2.1150	22 4 24.8	2.932
16	4 14 39.29	2.0279	18 0 31.0	7.285	16	5 54 15.46	2.1163	22 7 17.7	2.830
17	4 16 41.03	2.0300	18 7 45.7	7.204	17	5 56 22.48	2.1177	22 10 4.4	2.727
18	4 18 42.89	2.0321	18 14 55.5	7.121	18	5 58 29.59	2.1191	22 12 45.0	2.625
19	4 20 44.88	2.0342	18 22 0.3	7.038	19	6 0 36.77	2.1204	22 15 19.4	2.522
20	4 22 46.99	2.0362	18 29 0.1	6.955	20	6 2 44.03	2.1217	22 17 47.7	2.420
21	4 24 49.22	2.0382	18 35 54.9	6.872	21	6 4 51.37	2.1229	22 20 9.8	2.317
22	4 26 51.58	2.0403	18 42 44.7	6.787	22	6 6 58.78	2.1241	22 22 25.7	2.213
23	4 28 54.06	2.0424	N.18 49 29.4	0.702	23	6 9 6.26	2.1252	N.22 24 35.4	2.109
	THURSDAY 2.					**SATURDAY 4.**			
0	4 30 56.67	2.0445	N.18 56 9.0	6.617	0	6 11 13.80	2.1263	N.22 26 38.8	2.005
1	4 32 59.40	2.0466	19 2 43.4	6.531	1	6 13 21.41	2.1274	22 28 36.0	1.901
2	4 35 2.26	2.0487	19 9 12.7	6.445	2	6 15 29.09	2.1285	22 30 26.9	1.797
3	4 37 5.24	2.0507	19 15 36.8	6.358	3	6 17 36.83	2.1296	22 32 11.6	1.692
4	4 39 8.34	2.0527	19 21 55.6	6.270	4	6 19 44.64	2.1306	22 33 50.0	1.587
5	4 41 11.56	2.0547	19 28 9.2	6.182	5	6 21 52.50	2.1315	22 35 22.1	1.482
6	4 43 14.91	2.0568	19 34 17.5	6.094	6	6 24 0.42	2.1325	22 36 47.9	1.377
7	4 45 18.38	2.0588	19 40 20.5	6.005	7	6 26 8.40	2.1334	22 38 7.4	1.272
8	4 47 21.97	2.0608	19 46 18.1	5.915	8	6 28 16.43	2.1343	22 39 20.5	1.166
9	4 49 25.68	2.0628	19 52 10.3	5.825	9	6 30 24.51	2.1351	22 40 27.3	1.061
10	4 51 29.51	2.0648	19 57 57.1	5.735	10	6 32 32.64	2.1359	22 41 27.8	0.955
11	4 53 33.46	2.0668	20 3 38.5	5.645	11	6 34 40.82	2.1367	22 42 21.9	0.849
12	4 55 37.53	2.0688	20 9 14.5	5.553	12	6 36 49.04	2.1374	22 43 9.7	0.743
13	4 57 41.72	2.0707	20 14 44.9	5.461	13	6 38 57.30	2.1381	22 43 51.1	0.637
14	4 59 46.02	2.0727	20 20 9.8	5.369	14	6 41 5.61	2.1388	22 44 26.1	0.531
15	5 1 50.44	2.0747	20 25 29.2	5.277	15	6 43 13.96	2.1394	22 44 54.8	0.425
16	5 3 54.98	2.0766	20 30 43.0	5.183	16	6 45 22.34	2.1400	22 45 17.1	0.318
17	5 5 59.63	2.0784	20 35 51.2	5.089	17	6 47 30.76	2.1406	22 45 32.9	0.210
18	5 8 4.39	2.0803	20 40 53.7	4.995	18	6 49 39.22	2.1412	22 45 42.3	+ 0.103
19	5 10 9.26	2.0822	20 45 50.6	4.901	19	6 51 47.71	2.1417	22 45 45.3	− 0.003
20	5 12 14.25	2.0841	20 50 41.8	4.806	20	6 53 56.22	2.1421	22 45 41.9	0.110
21	5 14 19.35	2.0859	20 55 27.3	4.711	21	6 56 4.76	2.1425	22 45 32.1	0.217
22	5 16 24.56	2.0877	21 0 7.1	4.615	22	6 58 13.32	2.1429	22 45 15.9	0.324
23	5 18 29.87	2.0894	21 4 41.1	4.519	23	7 0 21.91	2.1433	22 44 53.3	0.431
24	5 20 35.29	2.0912	N.21 9 9.4	4.423	24	7 2 30.52	2.1436	N.22 44 24.2	0.538

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SUNDAY 5.

Hour.	Right Ascension. h m s	Diff. for 1 Minute. s	Declination. ° ′ ″	Diff. for 1 Minute. ″
0	7 2 30.52	2.1436	N.22 44 24.2	0.538
1	7 4 39.15	2.1439	22 43 48.7	0.645
2	7 6 47.79	2.1442	22 43 6.8	0.752
3	7 8 56.45	2.1444	22 42 18.4	0.860
4	7 11 5.12	2.1446	22 41 23.6	0.967
5	7 13 13.80	2.1448	22 40 22.4	1.074
6	7 15 22.50	2.1450	22 39 14.7	1.181
7	7 17 31.20	2.1450	22 38 0.6	1.288
8	7 19 39.90	2.1451	22 36 40.1	1.396
9	7 21 48.61	2.1452	22 35 13.1	1.503
10	7 23 57.32	2.1452	22 33 39.7	1.611
11	7 26 6.03	2.1452	22 31 59.8	1.718
12	7 28 14.74	2.1451	22 30 13.5	1.825
13	7 30 23.44	2.1450	22 28 20.8	1.932
14	7 32 32.14	2.1449	22 26 21.7	2.039
15	7 34 40.83	2.1448	22 24 16.2	2.146
16	7 36 49.51	2.1446	22 22 4.2	2.253
17	7 38 58.18	2.1443	22 19 45.8	2.360
18	7 41 6.83	2.1440	22 17 21.0	2.467
19	7 43 15.46	2.1438	22 14 49.8	2.573
20	7 45 24.08	2.1436	22 12 12.2	2.679
21	7 47 32.69	2.1433	22 9 28.3	2.785
22	7 49 41.28	2.1429	22 6 38.0	2.891
23	7 51 49.84	2.1425	N.22 3 41.3	2.997

MONDAY 6.

Hour.	Right Ascension. h m s	Diff. for 1 Minute. s	Declination. ° ′ ″	Diff. for 1 Minute. ″
0	7 53 58.38	2.1422	N.22 0 38.3	3.103
1	7 56 6.90	2.1418	21 57 28.9	3.209
2	7 58 15.39	2.1413	21 54 13.2	3.315
3	8 0 23.85	2.1408	21 50 51.1	3.421
4	8 2 32.28	2.1403	21 47 22.7	3.526
5	8 4 40.68	2.1398	21 43 48.0	3.632
6	8 6 49.05	2.1393	21 40 6.9	3.737
7	8 8 57.39	2.1387	21 36 19.5	3.841
8	8 11 5.69	2.1380	21 32 25.9	3.945
9	8 13 13.95	2.1374	21 28 26.1	4.049
10	8 15 22.18	2.1368	21 24 20.0	4.154
11	8 17 30.37	2.1362	21 20 7.6	4.259
12	8 19 38.52	2.1355	21 15 48.9	4.363
13	8 21 46.63	2.1348	21 11 24.0	4.466
14	8 23 54.70	2.1341	21 6 53.0	4.569
15	8 26 2.72	2.1334	21 2 15.8	4.672
16	8 28 10.70	2.1327	20 57 32.4	4.775
17	8 30 18.64	2.1320	20 52 42.8	4.878
18	8 32 26.54	2.1312	20 47 47.0	4.981
19	8 34 34.39	2.1304	20 42 45.1	5.083
20	8 36 42.19	2.1296	20 37 37.1	5.184
21	8 38 49.94	2.1288	20 32 23.0	5.286
22	8 40 57.64	2.1280	20 27 2.8	5.387
23	8 43 5.30	2.1272	20 21 36.5	5.488
24	8 45 12.91	2.1264	N.20 16 4.2	5.588

TUESDAY 7.

Hour.	Right Ascension. h m s	Diff. for 1 Minute. s	Declination. ° ′ ″	Diff. for 1 Minute. ″
0	8 45 12.91	2.1264	N.20 16 4.2	5.588
1	8 47 20.47	2.1255	20 10 25.9	5.689
2	8 49 27.97	2.1246	20 4 41.5	5.790
3	8 51 35.42	2.1237	19 58 51.1	5.889
4	8 53 42.82	2.1229	19 52 54.8	5.988
5	8 55 50.17	2.1220	19 46 52.5	6.088
6	8 57 57.46	2.1211	19 40 44.2	6.187
7	9 0 4.70	2.1202	19 34 30.0	6.286
8	9 2 11.89	2.1194	19 28 9.9	6.384
9	9 4 19.03	2.1185	19 21 44.0	6.481
10	9 6 26.11	2.1176	19 15 12.2	6.579
11	9 8 33.14	2.1167	19 8 34.5	6.676
12	9 10 40.11	2.1158	19 1 51.0	6.773
13	9 12 47.03	2.1149	18 55 1.7	6.870
14	9 14 53.90	2.1140	18 48 6.6	6.966
15	9 17 0.71	2.1131	18 41 5.8	7.061
16	9 19 7.47	2.1122	18 33 59.3	7.156
17	9 21 14.17	2.1113	18 26 47.1	7.251
18	9 23 20.82	2.1104	18 19 29.1	7.346
19	9 25 27.42	2.1095	18 12 5.5	7.440
20	9 27 33.96	2.1086	18 4 36.3	7.534
21	9 29 40.45	2.1077	17 57 1.4	7.627
22	9 31 46.89	2.1069	17 49 21.0	7.720
23	9 33 53.28	2.1061	N.17 41 35.0	7.812

WEDNESDAY 8.

Hour.	Right Ascension. h m s	Diff. for 1 Minute. s	Declination. ° ′ ″	Diff. for 1 Minute. ″
0	9 35 59.62	2.1052	N.17 33 43.5	7.904
1	9 38 5.91	2.1044	17 25 46.5	7.996
2	9 40 12.15	2.1035	17 17 44.0	8.087
3	9 42 18.33	2.1027	17 9 36.0	8.178
4	9 44 24.47	2.1019	17 1 22.6	8.268
5	9 46 30.56	2.1012	16 53 3.8	8.357
6	9 48 36.61	2.1004	16 44 39.7	8.447
7	9 50 42.61	2.0996	16 36 10.2	8.536
8	9 52 48.56	2.0989	16 27 35.4	8.625
9	9 54 54.47	2.0982	16 18 55.2	8.713
10	9 57 0.34	2.0975	16 10 9.8	8.800
11	9 59 6.17	2.0967	16 1 19.2	8.887
12	10 1 11.95	2.0960	15 52 23.4	8.973
13	10 3 17.69	2.0954	15 43 22.4	9.059
14	10 5 23.40	2.0948	15 34 16.3	9.144
15	10 7 29.07	2.0942	15 25 5.1	9.229
16	10 9 34.70	2.0936	15 15 48.8	9.314
17	10 11 40.30	2.0930	15 6 27.4	9.398
18	10 13 45.86	2.0924	14 57 1.0	9.482
19	10 15 51.39	2.0919	14 47 29.6	9.564
20	10 17 56.89	2.0914	14 37 53.3	9.646
21	10 20 2.36	2.0910	14 28 12.1	9.728
22	10 22 7.81	2.0906	14 18 26.0	9.809
23	10 24 13.23	2.0901	14 8 35.0	9.890
24	10 26 18.62	2.0897	N.13 58 39.2	9.970

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

THURSDAY 9.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	10 26 18.62	2.0897	N.13 58 39.2	9.970
1	10 28 23.99	2.0893	13 48 38.6	10.049
2	10 30 29.34	2.0890	13 38 33.3	10.128
3	10 32 34.67	2.0887	13 28 23.3	10.206
4	10 34 39.99	2.0885	13 18 8.6	10.284
5	10 36 45.29	2.0882	13 7 49.3	10.361
6	10 38 50.57	2.0879	12 57 25.3	10.438
7	10 40 55.84	2.0878	12 46 56.8	10.513
8	10 43 1.11	2.0877	12 36 23.8	10.588
9	10 45 6.37	2.0876	12 25 46.3	10.663
10	10 47 11.62	2.0875	12 15 4.3	10.737
11	10 49 16.87	2.0875	12 4 17.9	10.809
12	10 51 22.12	2.0875	11 53 27.2	10.881
13	10 53 27.37	2.0875	11 42 32.2	10.954
14	10 55 32.62	2.0876	11 31 32.8	11.026
15	10 57 37.88	2.0877	11 20 29.1	11.097
16	10 59 43.14	2.0879	11 9 21.2	11.166
17	11 1 48.42	2.0881	10 58 9.2	11.234
18	11 3 53.71	2.0883	10 46 53.1	11.303
19	11 5 59.01	2.0885	10 35 32.9	11.371
20	11 8 4.33	2.0888	10 24 8.6	11.438
21	11 10 9.67	2.0892	10 12 40.3	11.505
22	11 12 15.03	2.0896	10 1 8.0	11.571
23	11 14 20.42	2.0901	N. 9 49 31.8	11.635

FRIDAY 10

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	11 16 25.84	2.0906	N. 9 37 51.8	11.698
1	11 18 31.29	2.0911	9 26 8.0	11.762
2	11 20 36.77	2.0916	9 14 20.4	11.825
3	11 22 42.28	2.0922	9 2 29.0	11.887
4	11 24 47.83	2.0929	8 50 34.0	11.948
5	11 26 53.43	2.0936	8 38 35.3	12.008
6	11 28 59.07	2.0943	8 26 33.0	12.068
7	11 31 4.75	2.0951	8 14 27.1	12.126
8	11 33 10.48	2.0960	8 2 17.8	12.183
9	11 35 16.27	2.0970	7 50 5.1	12.240
10	11 37 22.12	2.0980	7 37 49.0	12.297
11	11 39 28.03	2.0990	7 25 29.5	12.352
12	11 41 34.00	2.1000	7 13 6.8	12.405
13	11 43 40.03	2.1011	7 0 40.9	12.459
14	11 45 46.13	2.1022	6 48 11.7	12.512
15	11 47 52.30	2.1034	6 35 39.4	12.564
16	11 49 58.54	2.1047	6 23 4.0	12.615
17	11 52 4.86	2.1060	6 10 25.6	12.664
18	11 54 11.26	2.1074	5 57 44.3	12.713
19	11 56 17.75	2.1088	5 45 0.1	12.761
20	11 58 24.32	2.1102	5 32 13.0	12.808
21	12 0 30.98	2.1117	5 19 23.1	12.854
22	12 2 37.73	2.1133	5 6 30.5	12.899
23	12 4 44.58	2.1150	4 53 35.2	12.944
24	12 6 51.53	2.1167	N. 4 40 37.2	12.987

SATURDAY 11.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	12 6 51.53	2.1167	N. 4 40 37.2	12.987
1	12 8 58.58	2.1184	4 27 36.7	13.029
2	12 11 5.74	2.1202	4 14 33.7	13.070
3	12 13 13.01	2.1221	4 1 28.3	13.110
4	12 15 20.39	2.1240	3 48 20.5	13.149
5	12 17 27.89	2.1260	3 35 10.4	13.187
6	12 19 35.51	2.1280	3 21 58.1	13.223
7	12 21 43.25	2.1300	3 8 43.6	13.259
8	12 23 51.11	2.1321	2 55 27.0	13.294
9	12 25 59.10	2.1343	2 42 8.3	13.328
10	12 28 7.23	2.1366	2 28 47.6	13.361
11	12 30 15.50	2.1389	2 15 25.0	13.392
12	12 32 23.90	2.1413	2 2 0.6	13.422
13	12 34 32.45	2.1438	1 48 34.4	13.451
14	12 36 41.15	2.1462	1 35 6.5	13.479
15	12 38 49.99	2.1487	1 21 36.9	13.506
16	12 40 58.99	2.1513	1 8 5.8	13.531
17	12 43 8.15	2.1540	0 54 33.2	13.556
18	12 45 17.47	2.1567	0 40 59.1	13.579
19	12 47 26.95	2.1594	0 27 23.7	13.601
20	12 49 36.60	2.1623	0 13 47.0	13.622
21	12 51 46.43	2.1652	N. 0 0 9.1	13.641
22	12 53 56.43	2.1682	S. 0 13 29.9	13.659
23	12 56 6.61	2.1712	S. 0 27 10.0	13.676

SUNDAY 12.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	12 58 16.98	2.1743	S. 0 40 51.0	13.691
1	13 0 27.53	2.1774	0 54 32.9	13.705
2	13 2 38.27	2.1806	1 8 15.6	13.718
3	13 4 49.20	2.1838	1 21 59.1	13.730
4	13 7 0.33	2.1871	1 35 43.2	13.740
5	13 9 11.66	2.1905	1 49 27.9	13.748
6	13 11 23.19	2.1939	2 3 13.0	13.755
7	13 13 34.93	2.1974	2 16 58.5	13.762
8	13 15 46.88	2.2009	2 30 44.4	13.767
9	13 17 59.04	2.2045	2 44 30.6	13.771
10	13 20 11.42	2.2082	2 58 16.9	13.772
11	13 22 24.02	2.2119	3 12 3.2	13.772
12	13 24 36.85	2.2157	3 25 49.5	13.771
13	13 26 49.90	2.2195	3 39 35.7	13.768
14	13 29 3.19	2.2234	3 53 21.7	13.764
15	13 31 16.71	2.2273	4 7 7.4	13.758
16	13 33 30.47	2.2313	4 20 52.7	13.752
17	13 35 44.47	2.2353	4 34 37.6	13.743
18	13 37 58.71	2.2394	4 48 21.9	13.732
19	13 40 13.20	2.2436	5 2 5.5	13.721
20	13 42 27.94	2.2478	5 15 48.4	13.707
21	13 44 42.93	2.2520	5 29 30.4	13.692
22	13 46 58.18	2.2564	5 43 11.5	13.676
23	13 49 13.70	2.2609	5 56 51.5	13.657
24	13 51 29.49	2.2653	S. 6 10 30.4	13.638

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	MONDAY 13.					**WEDNESDAY 15.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	13 51 29.49	2.2653	S. 6 10 30.4	13.638	0	15 46 1.38	2.5145	S. 16 9 19.9	10.615
1	13 53 45.54	2.2697	6 24 8.1	13.617	1	15 48 32.41	2.5198	16 19 53.6	10.507
2	13 56 1.86	2.2742	6 37 44.4	13.593	2	15 51 3.76	2.5251	16 30 20.8	10.398
3	13 58 18.44	2.2787	6 51 19.3	13.569	3	15 53 35.42	2.5304	16 40 41.4	10.287
4	14 0 35.30	2.2833	7 4 52.7	13.543	4	15 56 7.40	2.5356	16 50 55.2	10.174
5	14 2 52.44	2.2880	7 18 24.5	13.515	5	15 58 39.69	2.5407	17 1 2.2	10.059
6	14 5 9.86	2.2927	7 31 54.5	13.485	6	16 1 12.28	2.5457	17 11 2.3	9.942
7	14 7 27.56	2.2974	7 45 22.7	13.454	7	16 3 45.18	2.5508	17 20 55.3	9.824
8	14 9 45.55	2.3022	7 58 49.0	13.421	8	16 6 18.38	2.5558	17 30 41.2	9.705
9	14 12 3.83	2.3071	8 12 13.2	13.386	9	16 8 51.88	2.5607	17 40 19.9	9.583
10	14 14 22.40	2.3120	8 25 35.3	13.349	10	16 11 25.67	2.5657	17 49 51.2	9.460
11	14 16 41.27	2.3169	8 38 55.1	13.311	11	16 13 59.76	2.5706	17 59 15.1	9.335
12	14 19 0.43	2.3218	8 52 12.6	13.271	12	16 16 34.14	2.5753	18 8 31.4	9.208
13	14 21 19.89	2.3268	9 5 27.6	13.229	13	16 19 8.80	2.5800	18 17 40.1	9.081
14	14 23 39.65	2.3319	9 18 40.1	13.186	14	16 21 43.74	2.5847	18 26 41.1	8.951
15	14 25 59.72	2.3370	9 31 49.9	13.140	15	16 24 18.96	2.5893	18 35 34.2	8.819
16	14 28 20.09	2.3421	9 44 56.9	13.093	16	16 26 54.46	2.5939	18 44 19.4	8.687
17	14 30 40.77	2.3472	9 58 1.1	13.045	17	16 29 30.23	2.5984	18 52 56.6	8.553
18	14 33 1.75	2.3523	10 11 2.3	12.994	18	16 32 6.27	2.6028	19 1 25.8	8.418
19	14 35 23.04	2.3575	10 24 0.4	12.941	19	16 34 42.57	2.6071	19 9 46.8	8.280
20	14 37 44.65	2.3628	10 36 55.2	12.886	20	16 37 19.12	2.6112	19 17 59.4	8.141
21	14 40 6.58	2.3682	10 49 46.7	12.830	21	16 39 55.92	2.6153	19 26 3.7	8.002
22	14 42 28.83	2.3735	11 2 34.8	12.772	22	16 42 32.96	2.6194	19 33 59.6	7.860
23	14 44 51.40	2.3788	S. 11 15 19.4	12.712	23	16 45 10.25	2.6234	S. 19 41 46.9	7.717
	TUESDAY 14.					**THURSDAY 16.**			
0	14 47 14.29	2.3842	S. 11 28 0.3	12.651	0	16 47 47.77	2.6272	S. 19 49 25.6	7.573
1	14 49 37.50	2.3895	11 40 37.5	12.587	1	16 50 25.52	2.6310	19 56 55.6	7.428
2	14 52 1.03	2.3948	11 53 10.8	12.522	2	16 53 3.49	2.6347	20 4 16.9	7.281
3	14 54 24.88	2.4002	12 5 40.1	12.454	3	16 55 41.68	2.6383	20 11 29.3	7.132
4	14 56 49.05	2.4056	12 18 5.3	12.385	4	16 58 20.09	2.6419	20 18 32.8	6.983
5	14 59 13.55	2.4111	12 30 26.3	12.314	5	17 0 58.71	2.6452	20 25 27.3	6.833
6	15 1 38.38	2.4166	12 42 43.0	12.242	6	17 3 37.52	2.6484	20 32 12.8	6.682
7	15 4 3.54	2.4220	12 54 55.3	12.167	7	17 6 16.52	2.6516	20 38 49.1	6.529
8	15 6 29.02	2.4274	13 7 3.1	12.091	8	17 8 55.71	2.6547	20 45 16.2	6.375
9	15 8 54.83	2.4329	13 19 6.2	12.012	9	17 11 35.08	2.6576	20 51 34.1	6.221
10	15 11 20.97	2.4384	13 31 4.5	11.932	10	17 14 14.62	2.6604	20 57 42.7	6.065
11	15 13 47.44	2.4439	13 42 58.0	11.851	11	17 16 54.33	2.6632	21 3 41.9	5.907
12	15 16 14.24	2.4494	13 54 46.6	11.767	12	17 19 34.20	2.6658	21 9 31.6	5.749
13	15 18 41.37	2.4549	14 6 30.1	11.681	13	17 22 14.22	2.6682	21 15 11.8	5.591
14	15 21 8.83	2.4604	14 18 8.3	11.593	14	17 24 54.38	2.6704	21 20 42.5	5.432
15	15 23 36.62	2.4658	14 29 41.2	11.503	15	17 27 34.67	2.6726	21 26 3.7	5.272
16	15 26 4.73	2.4712	14 41 8.7	11.412	16	17 30 15.09	2.6747	21 31 15.2	5.110
17	15 28 33.17	2.4767	14 52 30.6	11.318	17	17 32 55.64	2.6767	21 36 16.9	4.948
18	15 31 1.94	2.4822	15 3 46.9	11.223	18	17 35 36.30	2.6786	21 41 8.9	4.785
19	15 33 31.04	2.4877	15 14 57.4	11.127	19	17 38 17.07	2.6803	21 45 51.1	4.622
20	15 36 0.46	2.4931	15 26 2.1	11.028	20	17 40 57.93	2.6818	21 50 23.5	4.458
21	15 38 30.21	2.4985	15 37 0.8	10.927	21	17 43 38.88	2.6832	21 54 46.1	4.293
22	15 41 0.28	2.5038	15 47 53.4	10.825	22	17 46 19.91	2.6844	21 58 58.7	4.128
23	15 43 30.67	2.5092	15 58 39.8	10.721	23	17 49 1.01	2.6856	22 3 1.4	3.962
24	15 46 1.38	2.5145	S. 16 9 19.9	10.615	24	17 51 42.18	2.6867	S. 22 6 54.1	3.795

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

FRIDAY 17.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	17 51 42.18	2.6867	S.22 6 54.1	3.795
1	17 54 23.41	2.6875	22 10 36.8	3.628
2	17 57 4.68	2.6882	22 14 9.5	3.461
3	17 59 45.99	2.6887	22 17 32.2	3.294
4	18 2 27.33	2.6892	22 20 44.8	3.126
5	18 5 8.69	2.6895	22 23 47.3	2.957
6	18 7 50.07	2.6897	22 26 39.7	2.789
7	18 10 31.45	2.6897	22 29 22.0	2.621
8	18 13 12.83	2.6895	22 31 54.2	2.452
9	18 15 54.19	2.6892	22 34 16.2	2.283
10	18 18 35.53	2.6888	22 36 28.1	2.114
11	18 21 16.85	2.6882	22 38 29.9	1.945
12	18 23 58.12	2.6874	22 40 21.5	1.776
13	18 26 39.34	2.6866	22 42 3.0	1.607
14	18 29 20.51	2.6856	22 43 34.3	1.437
15	18 32 1.61	2.6844	22 44 55.5	1.268
16	18 34 42.64	2.6832	22 46 6.5	1.099
17	18 37 23.59	2.6817	22 47 7.4	0.931
18	18 40 4.44	2.6800	22 47 58.2	0.762
19	18 42 45.19	2.6783	22 48 38.9	0.594
20	18 45 25.84	2.6765	22 49 9.5	0.426
21	18 48 6.37	2.6744	22 49 30.0	0.259
22	18 50 46.77	2.6722	22 49 40.5	− 0.092
23	18 53 27.04	2.6699	S.22 49 41.0	+ 0.075

SATURDAY 18.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	18 56 7.16	2.6674	S.22 49 31.5	0.242
1	18 58 47.13	2.6649	22 49 12.0	0.408
2	19 1 26.95	2.6622	22 48 42.6	0.573
3	19 4 6.60	2.6593	22 48 3.3	0.738
4	19 6 46.07	2.6563	22 47 14.1	0.902
5	19 9 25.36	2.6532	22 46 15.1	1.065
6	19 12 4.46	2.6500	22 45 6.3	1.228
7	19 14 43.36	2.6467	22 43 47.7	1.391
8	19 17 22.06	2.6432	22 42 19.4	1.552
9	19 20 0.54	2.6395	22 40 41.5	1.712
10	19 22 38.80	2.6358	22 38 54.0	1.872
11	19 25 16.84	2.6320	22 36 56.9	2.031
12	19 27 54.64	2.6280	22 34 50.3	2.189
13	19 30 32.20	2.6239	22 32 34.2	2.347
14	19 33 9.51	2.6197	22 30 8.7	2.503
15	19 35 46.56	2.6153	22 27 33.8	2.659
16	19 38 23.35	2.6109	22 24 49.6	2.814
17	19 40 59.87	2.6064	22 21 56.1	2.967
18	19 43 36.12	2.6018	22 18 53.5	3.120
19	19 46 12.09	2.5971	22 15 41.7	3.272
20	19 48 47.77	2.5922	22 12 20.8	3.423
21	19 51 23.16	2.5873	22 8 50.9	3.572
22	19 53 58.25	2.5823	22 5 12.1	3.720
23	19 56 33.03	2.5772	22 1 24.5	3.867
24	19 59 7.51	2.5720	S.21 57 28.1	4.013

SUNDAY 19.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	19 59 7.51	2.5720	S.21 57 28.1	4.013
1	20 1 41.67	2.5667	21 53 22.9	4.159
2	20 4 15.51	2.5613	21 49 9.0	4.302
3	20 6 49.02	2.5559	21 44 46.6	4.445
4	20 9 22.21	2.5504	21 40 15.6	4.587
5	20 11 55.07	2.5448	21 35 36.2	4.727
6	20 14 27.59	2.5391	21 30 48.4	4.866
7	20 16 59.76	2.5333	21 25 52.3	5.003
8	20 19 31.58	2.5274	21 20 48.0	5.140
9	20 22 3.05	2.5216	21 15 35.5	5.275
10	20 24 34.17	2.5157	21 10 15.0	5.408
11	20 27 4.94	2.5096	21 4 46.5	5.541
12	20 29 35.35	2.5037	20 59 10.1	5.672
13	20 32 5.39	2.4976	20 53 25.9	5.802
14	20 34 35.06	2.4914	20 47 33.9	5.931
15	20 37 4.36	2.4852	20 41 34.2	6.057
16	20 39 33.29	2.4790	20 35 27.0	6.182
17	20 42 1.84	2.4727	20 29 12.3	6.307
18	20 44 30.01	2.4663	20 22 50.1	6.431
19	20 46 57.80	2.4600	20 16 20.6	6.552
20	20 49 25.21	2.4537	20 9 43.8	6.672
21	20 51 52.24	2.4473	20 2 59.9	6.791
22	20 54 18.88	2.4408	19 56 8.9	6.908
23	20 56 45.13	2.4343	S.19 49 10.9	7.024

MONDAY 20.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	20 59 10.99	2.4278	S.19 42 6.0	7.139
1	21 1 36.46	2.4213	19 34 54.2	7.252
2	21 4 1.54	2.4148	19 27 35.7	7.363
3	21 6 26.23	2.4082	19 20 10.6	7.473
4	21 8 50.52	2.4016	19 12 38.9	7.582
5	21 11 14.42	2.3951	19 5 0.7	7.690
6	21 13 37.93	2.3885	18 57 16.1	7.796
7	21 16 1.04	2.3818	18 49 25.2	7.900
8	21 18 23.75	2.3753	18 41 28.1	8.003
9	21 20 46.07	2.3687	18 33 24.8	8.106
10	21 23 7.99	2.3621	18 25 15.4	8.206
11	21 25 29.52	2.3555	18 17 0.1	8.304
12	21 27 50.65	2.3489	18 8 38.9	8.402
13	21 30 11.38	2.3423	18 0 11.9	8.497
14	21 32 31.72	2.3358	17 51 39.2	8.592
15	21 34 51.67	2.3293	17 43 0.8	8.686
16	21 37 11.23	2.3227	17 34 16.9	8.777
17	21 39 30.39	2.3161	17 25 27.5	8.867
18	21 41 49.16	2.3096	17 16 32.8	8.956
19	21 44 7.54	2.3031	17 7 32.8	9.044
20	21 46 25.53	2.2966	16 58 27.5	9.131
21	21 48 43.13	2.2902	16 49 17.1	9.216
22	21 51 0.35	2.2837	16 40 1.6	9.299
23	21 53 17.18	2.2773	16 30 41.2	9.380
24	21 55 33.63	2.2710	S.16 21 16.0	9.460

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

TUESDAY 21.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	21 55 33.63	2.2710	S. 16 21 16.0	9.460
1	21 57 49.70	2.2647	16 11 46.0	9.540
2	22 0 5.39	2.2583	16 2 11.2	9.618
3	22 2 20.70	2.2520	15 52 31.8	9.695
4	22 4 35.63	2.2457	15 42 47.8	9.770
5	22 6 50.18	2.2394	15 32 59.4	9.843
6	22 9 4.36	2.2332	15 23 6.6	9.916
7	22 11 18.17	2.2271	15 13 9.5	9.987
8	22 13 31.61	2.2210	15 3 8.1	10.057
9	22 15 44.69	2.2150	14 53 2.6	10.126
10	22 17 57.41	2.2090	14 42 53.0	10.193
11	22 20 9.77	2.2030	14 32 39.4	10.259
12	22 22 21.77	2.1971	14 22 21.9	10.323
13	22 24 33.42	2.1912	14 12 0.6	10.387
14	22 26 44.71	2.1853	14 1 35.5	10.449
15	22 28 55.65	2.1795	13 51 6.7	10.510
16	22 31 6.25	2.1737	13 40 34.3	10.570
17	22 33 16.50	2.1680	13 29 58.3	10.628
18	22 35 26.41	2.1623	13 19 18.9	10.685
19	22 37 35.98	2.1567	13 8 36.1	10.741
20	22 39 45.22	2.1512	12 57 50.0	10.796
21	22 41 54.13	2.1457	12 47 0.6	10.850
22	22 44 2.71	2.1402	12 36 8.0	10.902
23	22 46 10.96	2.1348	S. 12 25 12.3	10.953

WEDNESDAY 22.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	22 48 18.89	2.1295	S. 12 14 13.7	11.002
1	22 50 26.50	2.1243	12 3 12.1	11.051
2	22 52 33.80	2.1191	11 52 7.6	11.099
3	22 54 40.79	2.1139	11 41 0.2	11.146
4	22 56 47.47	2.1088	11 29 50.1	11.191
5	22 58 53.84	2.1037	11 18 37.3	11.235
6	23 0 59.91	2.0987	11 7 21.9	11.278
7	23 3 5.68	2.0938	10 56 4.0	11.320
8	23 5 11.16	2.0889	10 44 43.5	11.361
9	23 7 16.35	2.0841	10 33 20.6	11.401
10	23 9 21.25	2.0793	10 21 55.4	11.439
11	23 11 25.87	2.0746	10 10 27.9	11.477
12	23 13 30.20	2.0699	9 58 58.2	11.513
13	23 15 34.26	2.0654	9 47 26.4	11.548
14	23 17 38.05	2.0609	9 35 52.5	11.583
15	23 19 41.57	2.0564	9 24 16.5	11.617
16	23 21 44.82	2.0520	9 12 38.5	11.649
17	23 23 47.81	2.0477	9 0 58.6	11.680
18	23 25 50.54	2.0434	8 49 16.9	11.710
19	23 27 53.02	2.0392	8 37 33.4	11.739
20	23 29 55.25	2.0351	8 25 48.2	11.767
21	23 31 57.23	2.0310	8 14 1.4	11.794
22	23 33 58.97	2.0271	8 2 13.0	11.820
23	23 36 0.48	2.0232	7 50 23.0	11.846
24	23 38 1.75	2.0193	S. 7 38 31.5	11.870

THURSDAY 23.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	23 38 1.75	2.0193	S. 7 38 31.5	11.870
1	23 40 2.79	2.0154	7 26 38.6	11.892
2	23 42 3.60	2.0117	7 14 44.4	11.914
3	23 44 4.19	2.0080	7 2 48.9	11.936
4	23 46 4.56	2.0043	6 50 52.1	11.957
5	23 48 4.71	2.0007	6 38 54.1	11.976
6	23 50 4.65	1.9973	6 26 55.0	11.994
7	23 52 4.39	1.9939	6 14 54.8	12.011
8	23 54 3.92	1.9905	6 2 53.6	12.027
9	23 56 3.25	1.9872	5 50 51.5	12.043
10	23 58 2.39	1.9840	5 38 48.4	12.059
11	0 0 1.33	1.9808	5 26 44.4	12.072
12	0 2 0.08	1.9777	5 14 39.7	12.085
13	0 3 58.65	1.9747	5 2 34.2	12.097
14	0 5 57.04	1.9717	4 50 28.0	12.108
15	0 7 55.26	1.9688	4 38 21.2	12.118
16	0 9 53.30	1.9659	4 26 13.8	12.128
17	0 11 51.17	1.9632	4 14 5.8	12.137
18	0 13 48.88	1.9605	4 1 57.4	12.144
19	0 15 46.43	1.9578	3 49 48.5	12.151
20	0 17 43.82	1.9552	3 37 39.2	12.157
21	0 19 41.06	1.9527	3 25 29.6	12.162
22	0 21 38.15	1.9502	3 13 19.7	12.167
23	0 23 35.09	1.9478	S. 3 1 9.6	12.170

FRIDAY 24.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	0 25 31.89	1.9455	S. 2 48 59.3	12.172
1	0 27 28.55	1.9432	2 36 48.9	12.174
2	0 29 25.08	1.9411	2 24 38.4	12.176
3	0 31 21.48	1.9390	2 12 27.8	12.176
4	0 33 17.76	1.9369	2 0 17.3	12.174
5	0 35 13.91	1.9348	1 48 6.9	12.173
6	0 37 9.94	1.9329	1 35 56.5	12.171
7	0 39 5.86	1.9311	1 23 46.3	12.168
8	0 41 1.67	1.9292	1 11 36.3	12.164
9	0 42 57.37	1.9274	0 59 26.6	12.159
10	0 44 52.96	1.9257	0 47 17.2	12.154
11	0 46 48.45	1.9241	0 35 8.1	12.148
12	0 48 43.85	1.9226	0 22 59.4	12.141
13	0 50 39.16	1.9211	S. 0 10 51.1	12.133
14	0 52 34.38	1.9196	N. 0 1 16.6	12.124
15	0 54 29.51	1.9182	0 13 23.8	12.115
16	0 56 24.56	1.9168	0 25 30.4	12.105
17	0 58 19.53	1.9155	0 37 36.4	12.094
18	1 0 14.42	1.9143	0 49 41.7	12.082
19	1 2 9.24	1.9132	1 1 46.3	12.070
20	1 4 4.00	1.9121	1 13 50.1	12.057
21	1 5 58.69	1.9110	1 25 53.2	12.044
22	1 7 53.32	1.9101	1 37 55.4	12.029
23	1 9 47.90	1.9092	1 49 56.7	12.013
24	1 11 42.42	1.9083	N. 2 1 57.0	11.997

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	SATURDAY 25.					MONDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	1 11 42.42	1.9083	N. 2 1 57.0	11.997	0	2 43 19.19	1.9272	N.11 5 40.1	10.388
1	1 13 36.89	1.9075	2 13 56.3	11.980	1	2 45 14.87	1.9287	11 16 1.9	10.338
2	1 15 31.32	1.9067	2 25 54.6	11.963	2	2 47 10.64	1.9302	11 26 20.6	10.287
3	1 17 25.70	1.9060	2 37 51.9	11.946	3	2 49 6.50	1.9317	11 36 36.3	10.236
4	1 19 20.04	1.9054	2 49 48.1	11.927	4	2 51 2.45	1.9333	11 46 48.9	10.183
5	1 21 14.35	1.9049	3 1 43.1	11.906	5	2 52 58.50	1.9349	11 56 58.3	10.129
6	1 23 8.63	1.9044	3 13 36.8	11.885	6	2 54 54.64	1.9365	12 7 4.4	10.075
7	1 25 2.88	1.9039	3 25 29.3	11.864	7	2 56 50.88	1.9382	12 17 7.3	10.021
8	1 26 57.10	1.9034	3 37 20.5	11.842	8	2 58 47.23	1.9400	12 27 6.9	9.966
9	1 28 51.29	1.9030	3 49 10.4	11.820	9	3 0 43.68	1.9417	12 37 3.2	9.910
10	1 30 45.46	1.9027	4 0 58.9	11.797	10	3 2 40.23	1.9434	12 46 56.1	9.853
11	1 32 39.62	1.9025	4 12 46.0	11.772	11	3 4 36.89	1.9452	12 56 45.6	9.796
12	1 34 33.76	1.9023	4 24 31.6	11.747	12	3 6 33.66	1.9471	13 6 31.6	9.738
13	1 36 27.89	1.9022	4 36 15.7	11.722	13	3 8 30.54	1.9489	13 16 14.2	9.680
14	1 38 22.02	1.9021	4 47 58.2	11.696	14	3 10 27.53	1.9508	13 25 53.2	9.620
15	1 40 16.14	1.9020	4 59 39.2	11.669	15	3 12 24.63	1.9527	13 35 28.6	9.560
16	1 42 10.26	1.9021	5 11 18.5	11.641	16	3 14 21.85	1.9546	13 45 0.4	9.499
17	1 44 4.39	1.9022	5 22 56.1	11.612	17	3 16 19.18	1.9565	13 54 28.5	9.438
18	1 45 58.52	1.9023	5 34 32.0	11.583	18	3 18 16.63	1.9585	14 3 52.9	9.376
19	1 47 52.66	1.9024	5 46 6.1	11.553	19	3 20 14.20	1.9605	14 13 13.6	9.314
20	1 49 46.81	1.9026	5 57 38.4	11.523	20	3 22 11.89	1.9625	14 22 30.6	9.252
21	1 51 40.98	1.9029	6 9 8.9	11.492	21	3 24 9.70	1.9645	14 31 43.8	9.188
22	1 53 35.16	1.9032	6 20 37.5	11.460	22	3 26 7.63	1.9666	14 40 53.1	9.123
23	1 55 29.36	1.9036	N. 6 32 4.1	11.427	23	3 28 5.69	1.9687	N.14 49 58.5	9.058
	SUNDAY 26.					TUESDAY 28.			
0	1 57 23.59	1.9041	N. 6 43 28.8	11.394	0	3 30 3.87	1.9708	N.14 59 0.0	8.992
1	1 59 17.85	1.9045	6 54 51.4	11.360	1	3 32 2.18	1.9729	15 7 57.5	8.925
2	2 1 12.13	1.9049	7 6 12.0	11.326	2	3 34 0.62	1.9750	15 16 51.0	8.858
3	2 3 6.44	1.9055	7 17 30.5	11.290	3	3 35 59.18	1.9771	15 25 40.4	8.790
4	2 5 0.79	1.9062	7 28 46.8	11.254	4	3 37 57.87	1.9793	15 34 25.8	8.722
5	2 6 55.18	1.9068	7 40 1.0	11.218	5	3 39 56.70	1.9816	15 43 7.0	8.653
6	2 8 49.61	1.9075	7 51 13.0	11.181	6	3 41 55.66	1.9838	15 51 44.1	8.583
7	2 10 44.08	1.9082	8 2 22.7	11.142	7	3 43 54.75	1.9859	16 0 17.0	8.512
8	2 12 38.59	1.9089	8 13 30.0	11.103	8	3 45 53.97	1.9881	16 8 45.6	8.441
9	2 14 33.15	1.9098	8 24 35.0	11.063	9	3 47 53.33	1.9904	16 17 9.9	8.369
10	2 16 27.77	1.9107	8 35 37.6	11.023	10	3 49 52.82	1.9927	16 25 29.9	8.297
11	2 18 22.44	1.9117	8 46 37.8	10.982	11	3 51 52.45	1.9950	16 33 45.5	8.224
12	2 20 17.17	1.9127	8 57 35.5	10.941	12	3 53 52.22	1.9972	16 41 56.8	8.151
13	2 22 11.96	1.9137	9 8 30.7	10.899	13	3 55 52.12	1.9995	16 50 3.6	8.076
14	2 24 6.81	1.9147	9 19 23.3	10.856	14	3 57 52.16	2.0018	16 58 5.9	8.001
15	2 26 1.72	1.9158	9 30 13.4	10.812	15	3 59 52.34	2.0041	17 6 3.7	7.926
16	2 27 56.70	1.9169	9 41 0.8	10.767	16	4 1 52.66	2.0064	17 13 57.0	7.851
17	2 29 51.75	1.9181	9 51 45.5	10.722	17	4 3 53.11	2.0087	17 21 45.8	7.775
18	2 31 46.87	1.9192	10 2 27.5	10.677	18	4 5 53.70	2.0110	17 29 30.0	7.697
19	2 33 42.06	1.9204	10 13 6.8	10.631	19	4 7 54.43	2.0133	17 37 9.5	7.619
20	2 35 37.32	1.9217	10 23 43.2	10.584	20	4 9 55.30	2.0157	17 44 44.3	7.540
21	2 37 32.66	1.9231	10 34 16.8	10.536	21	4 11 56.32	2.0181	17 52 14.3	7.461
22	2 39 28.09	1.9245	10 44 47.5	10.487	22	4 13 57.48	2.0204	17 59 39.6	7.382
23	2 41 23.60	1.9258	10 55 15.3	10.438	23	4 15 58.77	2.0227	18 7 0.1	7.301
24	2 43 19.19	1.9272	N.11 5 40.1	10.388	24	4 18 0.20	2.0250	N.18 14 15.7	7.220

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

WEDNESDAY 29.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	4 18 0.20	2.0250	N.18 14 15.7	7.220
1	4 20 1.77	2.0273	18 21 26.5	7.139
2	4 22 3.48	2.0297	18 28 32.4	7.057
3	4 24 5.34	2.0321	18 35 33.3	6.974
4	4 26 7.33	2.0344	18 42 29.2	6.890
5	4 28 9.46	2.0367	18 49 20.1	6.807
6	4 30 11.73	2.0390	18 56 6.0	6.723
7	4 32 14.14	2.0413	19 2 46.8	6.638
8	4 34 16.69	2.0436	19 9 22.5	6.552
9	4 36 19.37	2.0459	19 15 53.0	6.466
10	4 38 22.19	2.0482	19 22 18.4	6.379
11	4 40 25.15	2.0505	19 28 38.5	6.292
12	4 42 28.25	2.0528	19 34 53.4	6.204
13	4 44 31.49	2.0551	19 41 3.0	6.116
14	4 46 34.86	2.0573	19 47 7.3	6.027
15	4 48 38.36	2.0594	19 53 6.3	5.938
16	4 50 41.99	2.0617	19 58 59.9	5.848
17	4 52 45.76	2.0639	20 4 48.1	5.758
18	4 54 49.66	2.0661	20 10 30.9	5.667
19	4 56 53.69	2.0682	20 16 8.2	5.576
20	4 58 57.85	2.0704	20 21 40.0	5.484
21	5 1 2.14	2.0726	20 27 6.2	5.391
22	5 3 6.56	2.0747	20 32 26.9	5.299
23	5 5 11.10	2.0767	N.20 37 42.1	5.206

THURSDAY 30.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	5 7 15.77	2.0788	N.20 42 51.7	5.112
1	5 9 20.56	2.0809	20 47 55.6	5.017
2	5 11 25.48	2.0830	20 52 53.8	4.923
3	5 13 30.52	2.0850	20 57 46.4	4.828
4	5 15 35.68	2.0869	21 2 33.2	4.733
5	5 17 40.95	2.0888	21 7 14.3	4.637
6	5 19 46.34	2.0908	21 11 49.6	4.540
7	5 21 51.85	2.0927	21 16 19.1	4.443
8	5 23 57.47	2.0947	21 20 42.8	4.346
9	5 26 3.21	2.0966	21 25 0.6	4.248
10	5 28 9.06	2.0984	21 29 12.6	4.150
11	5 30 15.02	2.1002	21 33 18.6	4.051
12	5 32 21.08	2.1019	21 37 18.7	3.952
13	5 34 27.25	2.1037	21 41 12.9	3.853
14	5 36 33.52	2.1054	21 45 1.1	3.753
15	5 38 39.90	2.1071	21 48 43.3	3.653
16	5 40 46.38	2.1087	21 52 19.5	3.553
17	5 42 52.95	2.1103	21 55 49.7	3.452
18	5 44 59.62	2.1119	21 59 13.8	3.351
19	5 47 6.38	2.1135	22 2 31.8	3.249
20	5 49 13.24	2.1151	22 5 43.7	3.148
21	5 51 20.19	2.1166	22 8 49.6	3.047
22	5 53 27.23	2.1180	22 11 49.3	2.944
23	5 55 34.35	2.1193	22 14 42.9	2.841
24	5 57 41.55	2.1207	N.22 17 30.3	2.738

FRIDAY 31.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	5 57 41.55	2.1207	N.22 17 30.3	2.738
1	5 59 48.84	2.1221	22 20 11.5	2.635
2	6 1 56.20	2.1234	22 22 46.5	2.532
3	6 4 3.64	2.1247	22 25 15.3	2.428
4	6 6 11.16	2.1259	22 27 37.8	2.323
5	6 8 18.75	2.1271	22 29 54.1	2.219
6	6 10 26.41	2.1282	22 32 4.1	2.114
7	6 12 34.14	2.1293	22 34 7.8	2.009
8	6 14 41.93	2.1304	22 36 5.2	1.904
9	6 16 49.79	2.1315	22 37 56.3	1.799
10	6 18 57.71	2.1324	22 39 41.1	1.694
11	6 21 5.68	2.1333	22 41 19.6	1.589
12	6 23 13.71	2.1342	22 42 51.8	1.483
13	6 25 21.79	2.1351	22 44 17.6	1.377
14	6 27 29.92	2.1360	22 45 37.0	1.270
15	6 29 38.11	2.1368	22 46 50.0	1.164
16	6 31 46.34	2.1375	22 47 56.7	1.058
17	6 33 54.61	2.1382	22 48 57.0	0.952
18	6 36 2.92	2.1388	22 49 50.9	0.845
19	6 38 11.27	2.1395	22 50 38.4	0.738
20	6 40 19.66	2.1401	22 51 19.5	0.631
21	6 42 28.08	2.1406	22 51 54.1	0.524
22	6 44 36.53	2.1411	22 52 22.3	0.417
23	6 46 45.01	2.1415	N.22 52 44.1	0.309

SATURDAY, JUNE 1.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	6 48 53.51	2.1419	N.22 52 59.4	0.202

PHASES OF THE MOON.

		d	h	m
☽ First Quarter.	May	7	18	42.4
○ Full Moon		14	18	42.2
☾ Last Quarter		21	9	53.1
● New Moon		29	5	19.6

		d	h
☾ Apogee	May	3	8.5
☾ Perigee		15	18.8
☾ Apogee		30	17.0

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	SUN	W.	16° 10′ 22″	3547	17° 29′ 54″	3529	18° 49′ 46″	3515	20° 9′ 53″	3505
	Pollux	E.	55 32 13	3046	54 2 57	3053	52 33 50	3060	51 4 51	3066
	SATURN	E.	76 45 59	3023	75 16 15	3028	73 46 37	3034	72 17 6	3039
	Regulus	E.	91 17 15	3018	89 47 24	3022	88 17 39	3027	86 48 0	3032
2	SUN	W.	26 52 30	3483	28 13 13	3481	29 33 58	3480	30 54 44	3480
	Pollux	E.	43 41 56	3099	42 13 45	3106	40 45 43	3113	39 17 49	3119
	SATURN	E.	64 51 0	3061	63 22 3	3065	61 53 11	3069	60 24 24	3073
	Regulus	E.	79 21 14	3055	77 52 9	3058	76 23 8	3062	74 54 12	3066
3	SUN	W.	37 38 40	3479	38 59 28	3479	40 20 16	3479	41 41 4	3478
	Pollux	E.	32 0 31	3159	30 33 33	3169	29 6 47	3180	27 40 14	3193
	SATURN	E.	53 1 23	3086	51 32 56	3088	50 4 32	3089	48 36 9	3091
	Regulus	E.	67 30 31	3079	66 1 56	3081	64 33 23	3082	63 4 52	3083
4	SUN	W.	48 25 21	3471	49 46 17	3470	51 7 15	3467	52 28 16	3464
	Aldebaran	W.	24 43 43	3098	26 11 55	3096	27 40 10	3092	29 8 29	3089
	SATURN	E.	41 14 31	3092	39 46 12	3091	38 17 52	3091	36 49 31	3089
	Regulus	E.	55 42 32	3086	54 14 5	3085	52 45 37	3084	51 17 8	3083
	Spica	E.	109 38 57	3114	108 11 4	3111	106 43 8	3110	105 15 10	3108
5	SUN	W.	59 14 13	3446	60 35 38	3440	61 57 9	3435	63 18 46	3430
	Aldebaran	W.	36 31 10	3069	37 59 58	3065	39 28 51	3060	40 57 50	3054
	SATURN	E.	29 27 12	3078	27 58 35	3073	26 29 53	3070	25 1 7	3066
	Regulus	E.	43 54 13	3072	42 25 29	3069	40 56 41	3065	39 27 48	3061
	Spica	E.	97 54 35	3092	96 26 16	3088	94 57 52	3083	93 29 22	3078
6	SUN	W.	70 8 37	3394	71 31 0	3386	72 53 33	3377	74 16 16	3367
	Aldebaran	W.	48 24 36	3022	49 54 22	3014	51 24 18	3005	52 54 25	2996
	Regulus	E.	32 2 8	3038	30 32 42	3033	29 3 10	3028	27 33 32	3022
	Spica	E.	86 5 9	3047	84 35 55	3040	83 6 32	3033	81 37 0	3025
7	SUN	W.	81 12 42	3314	82 36 37	3302	84 0 46	3289	85 25 10	3276
	Aldebaran	W.	60 27 50	2947	61 59 9	2936	63 30 42	2925	65 2 29	2913
	Spica	E.	74 6 39	2979	72 36 0	2969	71 5 8	2958	69 34 2	2946
8	SUN	W.	92 31 6	3206	93 57 8	3190	95 23 29	3174	96 50 9	3158
	Aldebaran	W.	72 45 22	2848	74 18 48	2834	75 52 32	2819	77 26 35	2804
	Pollux	W.	29 0 6	2940	30 31 34	2917	32 3 31	2895	33 35 56	2874
	Spica	E.	61 54 56	2887	60 22 21	2874	58 49 29	2862	57 16 21	2848
	Antares	E.	107 49 12	2884	106 16 33	2869	104 43 35	2854	103 10 17	2839
9	SUN	W.	104 8 27	3073	105 37 10	3055	107 6 15	3036	108 35 43	3018
	Aldebaran	W.	85 21 53	2725	86 58 0	2707	88 34 30	2691	90 11 22	2673
	Pollux	W.	41 24 42	2772	42 59 46	2753	44 35 16	2733	46 11 12	2713
	SATURN	W.	19 22 59	2747	20 58 37	2729	22 34 39	2710	24 11 5	2692
	Spica	E.	49 26 19	2780	47 51 25	2767	46 16 14	2753	44 40 45	2740
	Antares	E.	95 18 44	2758	93 43 21	2741	92 7 36	2724	90 31 28	2707
10	SUN	W.	116 8 52	2922	117 40 43	2903	119 12 58	2883	120 45 38	2863
	Pollux	W.	54 17 28	2615	55 56 3	2595	57 35 5	2575	59 14 34	2556
	SATURN	W.	32 19 27	2599	33 58 24	2580	35 37 46	2562	37 17 33	2543

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Sun	W.	21° 30′ 12″	3497	22° 50′ 39″	3492	24° 11′ 12″	3488	25° 31′ 49″	3485
	Pollux	E.	49 36 0	3073	48 7 17	3079	46 38 42	3086	45 10 15	3092
	Saturn	E.	70 47 41	3043	69 18 22	3048	67 49 9	3053	66 20 2	3057
	Regulus	E.	85 18 27	3037	83 49 0	3042	82 19 39	3047	80 50 24	3051
2	Sun	W.	32 15 30	3480	33 36 17	3480	34 57 4	3479	36 17 52	3479
	Pollux	E.	37 50 3	3127	36 22 26	3134	34 54 58	3143	33 27 40	3150
	Saturn	E.	58 55 41	3076	57 27 2	3078	55 58 26	3081	54 29 53	3083
	Regulus	E.	73 25 21	3069	71 56 34	3072	70 27 50	3074	68 59 9	3077
3	Sun	W.	43 1 53	3477	44 22 43	3476	45 43 34	3474	47 4 27	3473
	Pollux	E.	26 13 56	3206	24 47 54	3221	23 22 10	3239	21 56 47	3262
	Saturn	E.	47 7 48	3091	45 39 28	3092	44 11 9	3092	42 42 50	3092
	Regulus	E.	61 36 22	3085	60 7 54	3085	58 39 26	3086	57 10 59	3086
4	Sun	W.	53 49 20	3462	55 10 27	3458	56 31 38	3454	57 52 53	3450
	Aldebaran	W.	30 36 52	3086	32 5 19	3082	33 33 51	3078	35 2 28	3073
	Saturn	E.	35 21 8	3087	33 52 43	3085	32 24 15	3083	30 55 45	3081
	Regulus	E.	49 48 38	3082	48 20 6	3079	46 51 31	3078	45 22 54	3074
	Spica	E.	103 47 10	3105	102 19 7	3102	100 51 0	3100	99 22 50	3096
5	Sun	W.	64 40 29	3423	66 2 19	3416	67 24 17	3409	68 46 23	3402
	Aldebaran	W.	42 26 56	3048	43 56 9	3042	45 25 30	3035	46 54 59	3029
	Saturn	E.	23 32 16	3062	22 3 20	3057	20 34 18	3053	19 5 11	3049
	Regulus	E.	37 58 51	3057	36 29 49	3052	35 0 41	3048	33 31 28	3043
	Spica	E.	92 0 45	3073	90 32 2	3067	89 3 12	3060	87 34 14	3055
6	Sun	W.	75 39 10	3358	77 2 15	3348	78 25 31	3337	79 49 0	3325
	Aldebaran	W.	54 24 43	2967	55 55 12	2978	57 25 52	2969	58 56 44	2958
	Regulus	E.	26 3 47	3017	24 33 55	3013	23 3 58	3009	21 33 56	3005
	Spica	E.	80 7 18	3016	78 37 25	3007	77 7 21	2998	75 37 6	2989
7	Sun	W.	86 49 49	3263	88 14 44	3249	89 39 55	3236	91 5 22	3221
	Aldebaran	W.	66 34 31	2901	68 6 49	2888	69 39 23	2875	71 12 14	2862
	Spica	E.	68 2 42	2935	66 31 8	2924	64 59 19	2912	63 27 15	2900
8	Sun	W.	98 17 8	3142	99 44 27	3125	101 12 6	3108	102 40 6	3091
	Aldebaran	W.	79 0 58	2788	80 35 41	2773	82 10 44	2757	83 46 8	2741
	Pollux	W.	35 8 48	2853	36 42 7	2833	38 15 52	2812	39 50 4	2792
	Spica	E.	55 42 56	2835	54 9 13	2821	52 35 13	2808	51 0 55	2794
	Antares	E.	101 36 40	2824	100 2 43	2808	98 28 25	2791	96 53 45	2775
9	Sun	W.	110 5 33	3000	111 35 47	2981	113 6 24	2961	114 37 26	2941
	Aldebaran	W.	91 48 38	2656	93 26 17	2638	95 4 20	2621	96 42 47	2602
	Pollux	W.	47 47 35	2693	49 24 24	2674	51 1 39	2655	52 39 20	2635
	Saturn	W.	25 47 56	2674	27 25 11	2655	29 2 51	2637	30 40 56	2618
	Spica	E.	43 4 58	2727	41 28 54	2714	39 52 33	2701	38 15 55	2689
	Antares	E.	88 54 58	2689	87 18 4	2672	85 40 46	2654	84 3 4	2636
10	Sun	W.	122 18 44	2844	123 52 15	2824	125 26 12	2805	127 0 34	2785
	Pollux	W.	60 54 30	2536	62 34 53	2517	64 15 43	2497	65 57 1	2477
	Saturn	W.	38 57 46	2524	40 38 26	2505	42 19 32	2487	44 1 4	2467

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LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	III^{h}.	P. L. of Diff.	VI^{h}.	P. L. of Diff.	IX^{h}.	P. L. of Diff.
			° ′ ″		° ′ ″		° ′ ″		° ′ ″	
10	Spica	E.	36 39 1	2679	35 1 53	2669	33 24 32	2661	31 47 0	2654
	Antares	E.	82 24 58	2618	80 46 28	2600	79 7 33	2583	77 28 14	2564
	Jupiter	E.	111 34 59	2564	109 55 15	2545	108 15 5	2527	106 34 30	2509
11	Sun	W.	128 35 21	2766	130 10 34	2747	131 46 12	2728	133 22 15	2708
	Pollux	W.	67 38 46	2458	69 20 58	2439	71 3 37	2419	72 46 44	2401
	Saturn	W.	45 43 3	2449	47 25 28	2430	49 8 20	2412	50 51 38	2393
	Regulus	W.	31 41 54	2454	33 24 12	2433	35 6 59	2413	36 50 15	2394
	Antares	E.	69 5 23	2475	67 23 34	2457	65 41 20	2440	63 58 42	2423
	Jupiter	E.	98 5 2	2415	96 21 49	2397	94 38 10	2378	92 54 4	2359
12	Pollux	W.	81 28 55	2311	83 14 39	2293	85 0 49	2276	86 47 24	2260
	Saturn	W.	59 34 44	2304	61 20 38	2286	63 6 58	2269	64 53 43	2253
	Regulus	W.	45 33 33	2299	47 19 34	2281	49 6 1	2264	50 52 53	2247
	Antares	E.	55 19 37	2343	53 34 40	2329	51 49 23	2315	50 3 45	2302
	Jupiter	E.	84 6 56	2270	82 20 12	2253	80 33 3	2237	78 45 30	2220
	α Aquilæ	E.	101 44 36	2970	100 13 46	2945	98 42 24	2922	97 10 33	2900
13	Saturn	W.	73 53 22	2176	75 42 26	2162	77 31 51	2149	79 21 35	2136
	Regulus	W.	59 53 23	2169	61 42 38	2154	63 32 15	2141	65 22 12	2128
	Antares	E.	41 11 11	2249	39 23 57	2243	37 36 34	2238	35 49 3	2235
	Jupiter	E.	69 41 44	2143	67 51 50	2129	66 1 35	2116	64 11 0	2103
	α Aquilæ	E.	89 25 0	2815	87 50 51	2803	86 16 27	2792	84 41 49	2783
14	Saturn	W.	88 34 54	2081	90 26 23	2072	92 18 6	2063	94 10 2	2055
	Regulus	W.	74 36 39	2071	76 28 23	2062	78 20 21	2053	80 12 32	2046
	Spica	W.	21 34 33	2305	23 20 25	2262	25 7 20	2227	26 55 8	2197
	Jupiter	E.	54 53 24	2047	53 1 3	2037	51 8 27	2029	49 15 38	2021
	α Aquilæ	E.	76 46 33	2767	75 11 22	2771	73 36 16	2776	72 1 17	2785
15	Saturn	W.	103 32 21	2028	105 25 12	2024	107 18 9	2021	109 11 11	2019
	Regulus	W.	89 36 9	2017	91 29 17	2014	93 22 30	2010	95 15 48	2009
	Spica	W.	36 3 13	2104	37 54 6	2093	39 45 16	2084	41 36 40	2076
	Jupiter	E.	39 48 52	1992	37 55 5	1989	36 1 13	1986	34 7 17	1984
	α Aquilæ	E.	64 10 11	2867	62 37 10	2894	61 4 43	2924	59 32 55	2958
16	Spica	W.	50 55 56	2058	52 48 0	2057	54 40 5	2058	56 32 9	2060
	α Aquilæ	E.	52 6 47	3212	50 40 52	3283	49 16 21	3363	47 53 22	3451
	Fomalhaut	E.	80 56 26	2207	79 8 9	2213	77 20 1	2219	75 32 2	2227
	α Pegasi	E.	97 31 18	2408	95 47 54	2408	94 4 31	2410	92 21 10	2412
17	Spica	W.	65 51 20	2082	67 42 47	2088	69 34 4	2096	71 25 10	2104
	Antares	W.	20 41 43	2333	22 26 55	2298	24 12 58	2272	25 59 38	2255
	Fomalhaut	E.	66 35 29	2283	64 49 4	2298	63 3 1	2315	61 17 23	2333
	α Pegasi	E.	83 46 6	2448	82 3 40	2460	80 21 30	2473	78 39 39	2487
18	Spica	W.	80 37 11	2154	82 26 48	2165	84 16 8	2178	86 5 9	2190
	Antares	W.	34 57 12	2229	36 44 56	2233	38 32 35	2237	40 20 8	2243
	Fomalhaut	E.	52 36 36	2450	50 54 13	2480	49 12 31	2512	47 31 34	2547
	α Pegasi	E.	70 16 6	2583	68 36 47	2606	66 58 0	2632	65 19 48	2659
	Venus	E.	110 3 37	2098	108 12 35	2111	106 21 53	2124	104 31 30	2137
	Sun	E.	134 46 33	2431	133 3 42	2443	131 21 8	2455	129 38 51	2467

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Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
10	Spica	E.	30° 9′ 18″	2649	28° 31′ 29″	2646	26° 53′ 37″	2648	25° 15′ 47″	2655
	Antares	E.	75 48 30	2546	74 8 21	2528	72 27 47	2510	70 46 48	2492
	JUPITER	E.	104 53 29	2490	103 12 2	2471	101 30 8	2453	99 47 48	2434
11	SUN	W.	134 58 44	2690	136 35 37	2672	138 12 55	2654	139 50 37	2636
	Pollux	W.	74 30 17	2382	76 14 17	2364	77 58 43	2346	79 43 36	2328
	SATURN	W.	52 35 23	2375	54 19 34	2357	56 4 11	2338	57 49 15	2321
	Regulus	W.	38 33 59	2374	40 18 11	2355	42 2 51	2336	43 47 58	2317
	Antares	E.	62 15 40	2406	60 32 14	2389	58 48 24	2374	57 4 12	2358
	JUPITER	E.	91 9 31	2342	89 24 32	2323	87 39 6	2306	85 53 14	2287
12	Pollux	W.	88 34 23	2243	90 21 46	2227	92 9 33	2212	93 57 43	2198
	SATURN	W.	66 40 52	2237	68 28 25	2221	70 16 21	2206	72 4 40	2190
	Regulus	W.	52 40 11	2230	54 27 54	2214	56 16 1	2198	58 4 31	2184
	Antares	E.	48 17 48	2289	46 31 33	2278	44 45 1	2267	42 58 13	2258
	JUPITER	E.	76 57 33	2204	75 9 11	2188	73 20 25	2172	71 31 16	2157
	α Aquilæ	E.	95 38 14	2880	94 5 29	2862	92 32 21	2845	90 58 51	2828
13	SATURN	W.	81 11 39	2124	83 2 2	2112	84 52 43	2101	86 43 40	2090
	Regulus	W.	67 12 29	2115	69 3 5	2103	70 53 59	2092	72 45 11	2081
	Antares	E.	34 1 28	2235	32 13 52	2236	30 26 18	2241	28 38 52	2251
	JUPITER	E.	62 20 5	2090	60 28 51	2079	58 37 19	2068	56 45 30	2057
	α Aquilæ	E.	83 6 59	2776	81 32 0	2771	79 56 54	2768	78 21 44	2767
14	SATURN	W.	96 2 10	2048	97 54 29	2042	99 46 58	2036	101 39 36	2032
	Regulus	W.	82 4 55	2039	83 57 29	2032	85 50 14	2026	87 43 8	2021
	Spica	W.	28 43 40	2172	30 32 49	2151	32 22 31	2133	34 12 40	2117
	JUPITER	E.	47 22 37	2014	45 29 25	2008	43 36 3	2002	41 42 32	1996
	α Aquilæ	E.	70 26 29	2795	68 51 54	2808	67 17 37	2825	65 43 41	2845
15	SATURN	W.	111 4 16	2018	112 57 22	2017	114 50 29	2018	116 43 35	2019
	Regulus	W.	97 9 9	2007	99 2 32	2007	100 55 55	2007	102 49 18	2009
	Spica	W.	43 28 16	2070	45 20 2	2065	47 11 55	2061	49 3 54	2059
	JUPITER	E.	32 13 17	1982	30 19 15	1982	28 25 12	1982	26 31 10	1983
	α Aquilæ	E.	58 1 50	2998	56 31 35	3043	55 2 15	3093	53 33 57	3149
16	Spica	W.	58 24 10	2062	60 16 7	2066	62 7 59	2070	63 59 44	2076
	α Aquilæ	E.	46 32 3	3550	45 12 34	3662	43 55 6	3786	42 39 49	3926
	Fomalhaut	E.	73 44 14	2235	71 56 39	2245	70 9 18	2256	68 22 14	2269
	α Pegasi	E.	90 37 53	2417	88 54 42	2422	87 11 39	2429	85 28 46	2438
17	Spica	W.	73 16 3	2113	75 6 42	2122	76 57 7	2132	78 47 17	2143
	Antares	W.	27 46 44	2243	29 34 8	2235	31 21 44	2230	33 9 27	2229
	Fomalhaut	E.	59 32 11	2353	57 47 28	2374	56 3 16	2398	54 19 38	2423
	α Pegasi	E.	76 58 8	2503	75 16 59	2520	73 36 14	2540	71 55 56	2560
18	Spica	W.	87 53 51	2203	89 42 14	2217	91 30 16	2231	93 17 58	2245
	Antares	W.	42 7 32	2250	43 54 45	2258	45 41 46	2268	47 28 33	2278
	Fomalhaut	E.	45 51 26	2585	44 12 10	2626	42 33 51	2672	40 56 33	2721
	α Pegasi	E.	63 42 13	2688	62 5 17	2719	60 29 3	2753	58 53 33	2788
	VENUS	E.	102 41 27	2151	100 51 45	2165	99 2 25	2179	97 13 26	2194
	SUN	E.	127 56 52	2481	126 15 12	2494	124 33 51	2509	122 52 50	2523

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19	Antares	W.	49° 15′ 5″	2289	51° 1′ 21″	2300	52° 47′ 21″	2312	54° 33′ 3″	2324
	Jupiter	W.	20 9 1	2203	21 57 24	2218	23 45 25	2233	25 33 4	2247
	Fomalhaut	E.	39 20 21	2776	37 45 22	2838	36 11 43	2906	34 39 32	2982
	Venus	E.	95 24 49	2209	93 36 35	2225	91 48 45	2241	90 1 18	2257
	Sun	E.	121 12 9	2538	119 31 49	2553	117 51 49	2568	116 12 10	2584
20	Antares	W.	63 16 51	2392	65 0 37	2407	66 44 2	2421	68 27 7	2436
	Jupiter	W.	34 25 51	2323	36 11 17	2338	37 56 21	2353	39 41 3	2369
	Venus	E.	81 10 4	2339	79 25 2	2356	77 40 24	2373	75 56 11	2391
	α Arietis	E.	85 1 22	2492	83 19 58	2509	81 38 57	2526	79 58 20	2543
	Sun	E.	107 59 24	2665	106 21 57	2681	104 44 52	2698	103 8 9	2714
21	Antares	W.	76 57 18	2510	78 38 17	2525	80 18 56	2540	81 59 14	2555
	Jupiter	W.	48 18 57	2445	50 1 27	2461	51 43 35	2477	53 25 21	2492
	Venus	E.	67 21 15	2476	65 39 28	2494	63 58 6	2511	62 17 8	2527
	α Arietis	E.	71 41 21	2634	70 3 12	2653	68 25 29	2672	66 48 11	2692
	Sun	E.	95 10 6	2798	93 35 35	2815	92 1 26	2831	90 27 38	2846
22	Jupiter	W.	61 49 3	2564	63 28 48	2578	65 8 13	2592	66 47 19	2605
	α Aquilæ	W.	49 59 25	3839	51 13 47	3794	52 28 55	3756	53 44 43	3723
	Venus	E.	53 58 7	2612	52 19 28	2628	50 41 11	2644	49 3 16	2660
	α Arietis	E.	58 48 24	2794	57 13 48	2816	55 39 41	2839	54 6 4	2862
	Sun	E.	82 43 45	2926	81 11 59	2941	79 40 32	2956	78 9 24	2971
23	Jupiter	W.	74 58 17	2670	76 35 37	2683	78 12 40	2695	79 49 27	2707
	α Aquilæ	W.	60 11 13	3608	61 29 39	3593	62 48 21	3580	64 7 17	3569
	Venus	E.	40 59 8	2741	39 23 22	2757	37 47 58	2773	36 12 55	2789
	α Arietis	E.	46 25 43	2991	44 55 19	3021	43 25 32	3052	41 56 23	3084
	Sun	E.	70 38 20	3042	69 8 59	3056	67 39 56	3069	66 11 9	3082
24	Jupiter	W.	87 49 31	2762	89 24 49	2772	90 59 53	2783	92 34 43	2793
	α Aquilæ	W.	70 44 22	3538	72 4 4	3535	73 23 49	3533	74 43 37	3532
	Fomalhaut	W.	35 17 14	3423	36 39 5	3389	38 1 34	3359	39 24 37	3333
	Sun	E.	58 51 6	3144	57 23 50	3156	55 56 48	3167	54 29 59	3178
25	Jupiter	W.	100 25 46	2838	101 59 24	2847	103 32 51	2855	105 6 7	2863
	α Aquilæ	W.	81 22 28	3542	82 42 6	3546	84 1 39	3551	85 21 7	3555
	Fomalhaut	W.	46 25 57	3253	47 51 3	3243	49 16 21	3235	50 41 49	3228
	α Pegasi	W.	35 1 29	4366	36 7 21	4265	37 14 46	4177	38 23 34	4100
	Sun	E.	47 19 11	3231	45 53 38	3241	44 28 17	3250	43 3 7	3259
26	Fomalhaut	W.	57 50 45	3209	59 16 44	3207	60 42 45	3206	62 8 47	3205
	α Pegasi	W.	44 23 50	3824	45 38 27	3786	46 53 44	3751	48 9 37	3721
	Sun	E.	36 0 1	3306	34 35 56	3313	33 12 0	3322	31 48 14	3331
27	Fomalhaut	W.	69 19 1	3208	70 45 1	3209	72 11 0	3209	73 36 58	3211
	α Pegasi	W.	54 36 13	3607	55 54 40	3590	57 13 25	3576	58 32 26	3562
	Sun	E.	24 51 55	3376	23 29 11	3386	22 6 38	3395	20 44 16	3407
31	Sun	W.	19 19 56	3488	20 40 33	3483	22 1 16	3478	23 22 5	3472
	Saturn	E.	45 54 10	3106	44 26 8	3107	42 58 7	3107	41 30 6	3106
	Regulus	E.	58 50 21	3083	57 21 51	3084	55 53 22	3085	54 24 54	3085

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19	Antares	W.	56° 18′ 27″	2337	58° 3′ 32″	2350	59° 48′ 18″	2364	61° 32′ 45″	2378
	Jupiter	W.	27 20 22	2262	29 7 18	2277	30 53 51	2292	32 40 2	2307
	Fomalhaut	E.	33 8 57	3069	31 40 9	3168	30 13 21	3281	28 48 47	3411
	Venus	E.	88 14 15	2273	86 27 36	2289	84 41 21	2306	82 55 30	2323
	Sun	E.	114 32 53	2600	112 53 58	2616	111 15 25	2632	109 37 14	2648
20	Antares	W.	70 9 51	2450	71 52 14	2465	73 34 16	2480	75 15 57	2494
	Jupiter	W.	41 25 22	2384	43 9 19	2400	44 52 54	2416	46 36 6	2431
	Venus	E.	74 12 23	2408	72 29 0	2425	70 46 1	2442	69 3 26	2459
	α Arietis	E.	78 18 7	2561	76 38 18	2579	74 58 54	2597	73 19 55	2615
	Sun	E.	101 31 48	2731	99 55 49	2748	98 20 13	2765	96 44 59	2781
21	Antares	W.	83 39 11	2570	85 18 47	2585	86 58 3	2599	88 37 0	2612
	Jupiter	W.	55 6 46	2506	56 47 51	2521	58 28 35	2535	60 8 59	2550
	Venus	E.	60 36 33	2545	58 56 22	2561	57 16 34	2578	55 37 9	2595
	α Arietis	E.	65 11 20	2712	63 34 56	2732	61 58 58	2752	60 23 27	2773
	Sun	E.	88 54 10	2862	87 21 3	2879	85 48 17	2894	84 15 51	2910
22	Jupiter	W.	68 26 7	2618	70 4 37	2632	71 42 48	2646	73 20 41	2658
	α Aquilæ	W.	55 1 6	3693	56 18 0	3668	57 35 21	3646	58 53 6	3625
	Venus	E.	47 25 43	2677	45 48 32	2693	44 11 43	2709	42 35 15	2725
	α Arietis	E.	52 32 57	2886	51 0 20	2911	49 28 15	2936	47 56 42	2963
	Sun	E.	76 38 35	2986	75 8 5	3001	73 37 53	3014	72 7 58	3028
23	Jupiter	W.	81 25 58	2719	83 2 13	2730	84 38 13	2741	86 13 59	2751
	α Aquilæ	W.	65 26 25	3559	66 45 44	3552	68 5 11	3546	69 24 44	3542
	Venus	E.	34 38 13	2805	33 3 52	2822	31 29 53	2838	29 56 15	2855
	α Arietis	E.	40 27 54	3119	39 0 8	3158	37 33 8	3199	36 6 58	3245
	Sun	E.	64 42 37	3095	63 14 21	3108	61 46 21	3120	60 18 36	3133
24	Jupiter	W.	94 9 20	2802	95 43 45	2812	97 17 57	2821	98 51 57	2830
	α Aquilæ	W.	76 3 26	3533	77 23 14	3534	78 43 1	3535	80 2 46	3538
	Fomalhaut	W.	40 48 10	3312	42 12 8	3294	43 36 27	3278	45 1 4	3265
	Sun	E.	53 3 24	3189	51 37 2	3200	50 10 53	3210	48 44 56	3220
25	Jupiter	W.	106 39 13	2871	108 12 9	2879	109 44 55	2887	111 17 31	2894
	α Aquilæ	W.	86 40 30	3562	87 59 46	3568	89 18 55	3576	90 37 56	3584
	Fomalhaut	W.	52 7 25	3222	53 33 8	3218	54 58 56	3214	56 24 49	3211
	α Pegasi	W.	39 33 36	4031	40 44 45	3970	41 56 54	3917	43 9 57	3867
	Sun	E.	41 38 8	3269	40 13 20	3278	38 48 43	3288	37 24 17	3296
26	Fomalhaut	W.	63 34 50	3205	65 0 53	3205	66 26 56	3205	67 52 59	3206
	α Pegasi	W.	49 26 2	3693	50 42 57	3667	52 0 19	3645	53 18 5	3624
	Sun	E.	30 24 38	3339	29 1 12	3348	27 37 56	3357	26 14 50	3366
27	Fomalhaut	W.	75 2 54	3214	76 28 47	3216	77 54 37	3218	79 20 25	3220
	α Pegasi	W.	59 51 42	3550	61 11 11	3539	62 30 52	3530	63 50 43	3521
	Sun	E.	19 22 7	3419	18 0 12	3433	16 38 33	3449	15 17 12	3469
31	Sun	W.	24 43 0	3469	26 3 59	3465	27 25 2	3462	28 46 9	3457
	Saturn	E.	40 2 4	3106	38 34 2	3105	37 5 59	3105	35 37 55	3104
	Regulus	E.	52 56 26	3084	51 27 57	3084	49 59 28	3083	48 30 58	3082

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from / Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Sat.	1	4 38 14.28	10.241	N.22 7 21.5	+19.97	15 48.24	68.44	2 23.58	0.384
SUN.	2	4 42 20.25	10.256	22 15 9.4	19.00	15 48.11	68.49	2 14.19	0.399
Mon.	3	4 46 26.59	10.271	22 22 34.0	18.03	15 47.99	68.54	2 4.44	0.414
Tues.	4	4 50 33.27	10.285	22 29 35.1	+17.05	15 47.87	68.59	1 54.34	0.428
Wed.	5	4 54 40.28	10.298	22 36 12.5	16.06	15 47.76	68.64	1 43.92	0.441
Thur.	6	4 58 47.59	10.310	22 42 26.1	15.07	15 47.65	68.68	1 33.20	0.453
Frid.	7	5 2 55.18	10.322	22 48 15.8	+14.07	15 47.54	68.72	1 22.20	0.465
Sat.	8	5 7 3.04	10.332	22 53 41.4	13.06	15 47.44	68.76	1 10.93	0.475
SUN.	9	5 11 11.15	10.342	22 58 42.9	12.05	15 47.35	68.80	0 59.40	0.485
Mon.	10	5 15 19.49	10.351	23 3 20.1	+11.04	15 47.26	68.83	0 47.66	0.494
Tues.	11	5 19 28.04	10.360	23 7 33.0	10.02	15 47.17	68.86	0 35.71	0.503
Wed.	12	5 23 36.77	10.367	23 11 21.4	9.00	15 47.08	68.89	0 23.57	0.510
Thur.	13	5 27 45.68	10.374	23 14 45.4	+ 7.98	15 46.99	68.91	0 11.25	0.517
Frid.	14	5 31 54.74	10.380	23 17 44.8	6.96	15 46.90	68.93	0 1.22	0.523
Sat.	15	5 36 3.94	10.385	23 20 19.5	5.93	15 46.82	68.94	0 13.83	0.528
SUN.	16	5 40 13.25	10.390	23 22 29.5	+ 4.91	15 46.74	68.96	0 26.55	0.533
Mon.	17	5 44 22.67	10.394	23 24 14.9	3.88	15 46.67	68.97	0 39.38	0.537
Tues.	18	5 48 32.16	10.396	23 25 35.6	2.85	15 46.60	68.97	0 52.28	0.539
Wed.	19	5 52 41.71	10.398	23 26 31.5	+ 1.82	15 46.54	68.97	1 5.24	0.541
Thur.	20	5 56 51.29	10.399	23 27 2.6	+ 0.79	15 46.48	68.97	1 18.22	0.542
Frid.	21	6 1 0.89	10.399	23 27 9.0	− 0.25	15 46.42	68.97	1 31.22	0.542
Sat.	22	6 5 10.47	10.398	23 26 50.6	− 1.28	15 46.37	68.97	1 44.20	0.541
SUN.	23	6 9 20.02	10.396	23 26 7.4	2.31	15 46.32	68.96	1 57.16	0.539
Mon.	24	6 13 29.50	10.392	23 24 59.4	3.35	15 46.28	68.95	2 10.05	0.535
Tues.	25	6 17 38.89	10.388	23 23 26.7	− 4.38	15 46.24	68.93	2 22.85	0.531
Wed.	26	6 21 48.16	10.382	23 21 29.3	5.41	15 46.21	68.92	2 35.53	0.525
Thur.	27	6 25 57.30	10.376	23 19 7.3	6.43	15 46.18	68.89	2 48.08	0.519
Frid.	28	6 30 6.26	10.368	23 16 20.7	− 7.45	15 46.16	68.86	3 0.45	0.511
Sat.	29	6 34 15.03	10.360	23 13 9.6	8.47	15 46.14	68.83	3 12.63	0.503
SUN.	30	6 38 23.57	10.350	23 9 34.0	9.49	15 46.13	68.80	3 24.58	0.493
Mon.	31	6 42 31.87	10.340	N.23 5 34.1	−10.50	15 46.13	68.77	3 36.29	0.483

NOTE.—The mean time of semidiameter passing may be found by subtracting $0^{s}.19$ from the sidereal time.
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign − indicates that north declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	THE SUN'S Diff. for 1 Hour.	THE SUN'S Apparent Declination.	THE SUN'S Diff. for 1 Hour.	Equation of Time, to be Added to / Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ′ ″	″	m s	s	h m s
Sat.	1	4 38 14.70	10.240	N. 22 7 22.3	+19.97	2 23.57	0.384	4 40 38.27
SUN.	2	4 42 20.64	10.255	22 15 10.1	19.00	2 14.18	0.399	4 44 34.82
Mon.	3	4 46 26.95	10.270	22 22 34.6	18.03	2 4.43	0.414	4 48 31.38
Tues.	4	4 50 33.60	10.284	22 29 35.6	+17.05	1 54.34	0.428	4 52 27.94
Wed.	5	4 54 40.58	10.297	22 36 12.9	16.06	1 43.91	0.441	4 56 24.49
Thur.	6	4 58 47.86	10.309	22 42 26.5	15.07	1 33.19	0.453	5 0 21.05
Frid.	7	5 2 55.42	10.321	22 48 16.1	+14.07	1 22.19	0.465	5 4 17.61
Sat.	8	5 7 3.25	10.331	22 53 41.7	13.06	1 10.92	0.475	5 8 14.17
SUN.	9	5 11 11.33	10.341	22 58 43.1	12.05	0 59.39	0.485	5 12 10.72
Mon.	10	5 15 19.63	10.350	23 3 20.3	+11.04	0 47.65	0.494	5 16 7.28
Tues.	11	5 19 28.14	10.359	23 7 33.1	10.02	0 35.70	0.503	5 20 3.84
Wed.	12	5 23 36.84	10.366	23 11 21.5	9.00	0 23.56	0.510	5 24 0.40
Thur.	13	5 27 45.71	10.373	23 14 45.4	+ 7.98	0 11.25	0.517	5 27 56.96
Frid.	14	5 31 54.74	10.379	23 17 44.8	6.96	0 1.22	0.523	5 31 53.52
Sat.	15	5 36 3.90	10.384	23 20 19.5	5.93	0 13.83	0.528	5 35 50.07
SUN.	16	5 40 13.18	10.389	23 22 29.5	+ 4.90	0 26.55	0.533	5 39 46.63
Mon.	17	5 44 22.56	10.393	23 24 14.9	3.88	0 39.37	0.537	5 43 43.19
Tues.	18	5 48 32.02	10.395	23 25 35.6	2.85	0 52.27	0.539	5 47 39.75
Wed.	19	5 52 41.53	10.397	23 26 31.5	+ 1.82	1 5.23	0.541	5 51 36.30
Thur.	20	5 56 51.07	10.398	23 27 2.6	+ 0.79	1 18.21	0.542	5 55 32.86
Frid.	21	6 1 0.63	10.398	23 27 9.0	− 0.25	1 31.21	0.542	5 59 29.42
Sat.	22	6 5 10.17	10.397	23 26 50.6	− 1.28	1 44.19	0.541	6 3 25.98
SUN.	23	6 9 19.68	10.395	23 26 7.4	2.31	1 57.15	0.539	6 7 22.53
Mon.	24	6 13 29.13	10.391	23 24 59.5	3.35	2 10.04	0.535	6 11 19.09
Tues.	25	6 17 38.48	10.387	23 23 26.8	− 4.38	2 22.83	0.531	6 15 15.65
Wed.	26	6 21 47.72	10.381	23 21 29.5	5.41	2 35.51	0.525	6 19 12.21
Thur.	27	6 25 56.82	10.375	23 19 7.5	6.43	2 48.06	0.519	6 23 8.76
Frid.	28	6 30 5.75	10.367	23 16 21.0	− 7.45	3 0.43	0.511	6 27 5.32
Sat.	29	6 34 14.48	10.359	23 13 10.0	8.47	3 12.60	0.503	6 31 1.88
SUN.	30	6 38 22.99	10.349	23 9 34.5	9.49	3 24.55	0.493	6 34 58.44
Mon.	31	6 42 31.25	10.339	N. 23 5 34.7	−10.50	3 36.26	0.483	6 38 54.99

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign — indicates that north declinations are decreasing.

Diff. for 1 hour, $+9^s.8565$. (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S TRUE LONGITUDE. λ	THE SUN'S TRUE LONGITUDE. λ′	Diff. for 1 Hour.	LATITUDE.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		° ′ ″	′ ″	″	″			h m s
1	152	71 7 51.8	7 48.7	143.68	− 0.14	0.0062552	+24.9	19 16 11.81
2	153	72 5 19.7	5 16.4	143.63	− 0.01	0.0063138	24.0	19 12 15.90
3	154	73 2 46.4	2 42.9	143.59	+ 0.11	0.0063701	23.0	19 8 19.99
4	155	74 0 12.0	0 8.3	143.54	+ 0.21	0.0064243	+22.1	19 4 24.07
5	156	74 57 36.4	57 32.6	143.49	0.29	0.0064764	21.3	19 0 28.16
6	157	75 54 59.7	54 55.7	143.44	0.35	0.0065266	20.5	18 56 32.25
7	158	76 52 21.9	52 17.7	143.40	+ 0.38	0.0065749	+19.8	18 52 36.34
8	159	77 49 43.0	49 38.6	143.36	0.38	0.0066215	19.1	18 48 40.42
9	160	78 47 3.1	46 58.5	143.32	0.35	0.0066665	18.4	18 44 44.51
10	161	79 44 22.3	44 17.5	143.28	+ 0.30	0.0067100	+17.8	18 40 48.60
11	162	80 41 40.6	41 35.7	143.25	0.22	0.0067521	17.3	18 36 52.69
12	163	81 38 58.1	38 53.0	143.22	+ 0.11	0.0067928	16.7	18 32 56.77
13	164	82 36 14.9	36 9.6	143.19	− 0.02	0.0068322	+16.2	18 29 0.86
14	165	83 33 31.1	33 25.6	143.17	0.15	0.0068703	15.6	18 25 4.95
15	166	84 30 46.8	30 41.1	143.15	0.28	0.0069070	15.0	18 21 9.04
16	167	85 28 2.0	27 56.2	143.13	− 0.41	0.0069422	+14.4	18 17 13.12
17	168	86 25 16.9	25 10.9	143.12	0.54	0.0069759	13.7	18 13 17.21
18	169	87 22 31.6	22 25.3	143.11	0.65	0.0070081	13.1	18 9 21.30
19	170	88 19 46.0	19 39.6	143.10	− 0.73	0.0070387	+12.4	18 5 25.39
20	171	89 17 0.2	16 53.7	143.10	0.78	0.0070674	11.6	18 1 29.47
21	172	90 14 14.3	14 7.6	143.09	0.81	0.0070941	10.8	17 57 33.56
22	173	91 11 28.4	11 21.5	143.09	− 0.81	0.0071188	+ 9.9	17 53 37.65
23	174	92 8 42.4	8 35.3	143.09	0.78	0.0071413	8.9	17 49 41.74
24	175	93 5 56.3	5 49.1	143.09	0.72	0.0071613	7.9	17 45 45.83
25	176	94 3 10.2	3 2.8	143.08	− 0.63	0.0071788	+ 6.8	17 41 49.92
26	177	95 0 24.0	0 16.5	143.08	0.52	0.0071939	5.8	17 37 54.01
27	178	95 57 37.7	57 30.0	143.07	0.40	0.0072064	4.7	17 33 58.10
28	179	96 54 51.2	54 43.4	143.07	− 0.27	0.0072162	+ 3.6	17 30 2.18
29	180	97 52 4.6	51 56.6	143.06	0.13	0.0072233	2.5	17 26 6.27
30	181	98 49 17.9	49 9.7	143.05	− 0.01	0.0072279	1.4	17 22 10.36
31	182	99 46 31.0	46 22.6	143.04	+ 0.09	0.0072299	+ 0.3	17 18 14.45

NOTE.—The numbers in column λ correspond to the true equinox of the date; in column λ′, to the mean equinox of January $0^d.0$.

Diff. for 1 Hour, — $9^s.8296$. (Table II.)

GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	14 45.3	14 46.6	54 2.1	+0.33	54 6.9	+0.47	2 12.6	2.05	2.8
2	14 48.4	14 50.7	54 13.4	0.62	54 21.8	0.78	3 1.7	2.04	3.8
3	14 53.5	14 56.8	54 32.1	0.94	54 44.4	1.11	3 50.4	2.01	4.8
4	15 0.7	15 5.2	54 58.8	+1.29	55 15.3	+1.46	4 38.2	1.97	5.8
5	15 10.3	15 15.9	55 33.9	1.63	55 54.5	1.80	5 25.2	1.94	6.8
6	15 22.0	15 28.6	56 17.0	1.95	56 41.3	2.09	6 11.7	1.93	7.8
7	15 35.7	15 43.1	57 7.2	+2.21	57 34.4	+2.30	6 58.1	1.95	8.8
8	15 50.7	15 58.5	58 2.4	2.36	58 30.9	2.37	7 45.5	2.01	9.8
9	16 6.2	16 13.7	58 59.3	2.34	59 26.9	2.25	8 34.8	2.11	10.8
10	16 20.9	16 27.5	59 53.2	+2.11	60 17.4	+1.90	9 27.1	2.26	11.8
11	16 33.3	16 38.1	60 38.7	1.63	60 56.5	1.32	10 23.3	2.43	12.8
12	16 41.9	16 44.4	61 10.3	0.96	61 19.5	+0.56	11 23.6	2.59	13.8
13	16 45.6	16 45.3	61 23.8	+0.14	61 23.0	−0.28	12 27.1	2.69	14.8
14	16 43.8	16 40.9	61 17.2	−0.68	61 6.6	1.07	13 31.8	2.68	15.8
15	16 36.8	16 31.6	60 51.5	1.42	60 32.6	1.71	14 35.0	2.57	16.8
16	16 25.6	16 18.9	60 10.5	−1.95	59 45.8	−2.14	15 34.6	2.38	17.8
17	16 11.7	16 4.1	59 19.3	2.26	58 51.7	2.33	16 29.6	2.19	18.8
18	15 56.4	15 48.8	58 23.4	2.35	57 55.4	2.32	17 20.3	2.03	19.8
19	15 41.3	15 34.1	57 27.8	−2.26	57 1.3	−2.16	18 7.4	1.90	20.8
20	15 27.2	15 20.8	56 36.1	2.03	56 12.5	1.89	18 52.1	1.83	21.8
21	15 14.9	15 9.4	55 50.7	1.74	55 30.8	1.58	19 35.5	1.79	22.8
22	15 4.6	15 0.3	55 12.9	−1.41	54 57.1	−1.24	20 18.5	1.80	23.8
23	14 56.5	14 53.2	54 43.2	1.08	54 31.2	0.92	21 2.1	1.84	24.8
24	14 50.5	14 48.3	54 21.2	0.76	54 13.0	0.61	21 46.8	1.89	25.8
25	14 46.5	14 45.2	54 6.6	−0.47	54 1.8	−0.33	22 32.9	1.96	26.8
26	14 44.3	14 43.9	53 58.6	−0.20	53 56.9	−0.08	23 20.6	2.01	27.8
27	14 43.8	14 44.1	53 56.6	+0.03	53 57.7	+0.15	ó		28.8
28	14 44.8	14 45.8	54 0.2	+0.26	54 4.0	+0.37	0 9.3	2.05	0.1
29	14 47.2	14 48.9	54 9.0	0.48	54 15.4	0.59	0 58.6	2.05	1.1
30	14 51.0	14 53.5	54 23.1	0.70	54 32.2	0.82	1 47.6	2.03	2.1
31	14 56.3	14 59.6	54 42.7	+0.94	54 54.7	+1.06	2 35.8	1.98	3.1

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SATURDAY 1.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	6 48 53.51	2.1419	N.22 52 59.4	0.202
1	6 51 2.04	2.1423	22 53 8.3	+ 0.095
2	6 53 10.59	2.1426	22 53 10.8	− 0.012
3	6 55 19.15	2.1428	22 53 6.8	0.120
4	6 57 27.73	2.1431	22 52 56.4	0.228
5	6 59 36.32	2.1433	22 52 39.5	0.336
6	7 1 44.92	2.1434	22 52 16.1	0.443
7	7 3 53.53	2.1435	22 51 46.3	0.551
8	7 6 2.14	2.1436	22 51 10.0	0.658
9	7 8 10.76	2.1437	22 50 27.3	0.766
10	7 10 19.38	2.1436	22 49 38.1	0.873
11	7 12 27.99	2.1435	22 48 42.5	0.980
12	7 14 36.60	2.1434	22 47 40.5	1.087
13	7 16 45.20	2.1432	22 46 32.0	1.195
14	7 18 53.79	2.1431	22 45 17.1	1.302
15	7 21 2.37	2.1429	22 43 55.7	1.410
16	7 23 10.94	2.1426	22 42 27.9	1.517
17	7 25 19.49	2.1423	22 40 53.6	1.625
18	7 27 28.02	2.1420	22 39 12.9	1.732
19	7 29 36.53	2.1416	22 37 25.8	1.838
20	7 31 45.01	2.1412	22 35 32.3	1.945
21	7 33 53.47	2.1407	22 33 32.4	2.052
22	7 36 1.90	2.1402	22 31 26.1	2.158
23	7 38 10.30	2.1397	N.22 29 13.4	2.265

SUNDAY 2.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	7 40 18.67	2.1391	N.22 26 54.3	2.372
1	7 42 27.00	2.1385	22 24 28.8	2.478
2	7 44 35.29	2.1379	22 21 57.0	2.583
3	7 46 43.55	2.1372	22 19 18.8	2.689
4	7 48 51.76	2.1365	22 16 34.3	2.795
5	7 50 59.93	2.1358	22 13 43.4	2.901
6	7 53 8.06	2.1351	22 10 46.2	3.006
7	7 55 16.14	2.1343	22 7 42.7	3.111
8	7 57 24.17	2.1334	22 4 32.9	3.215
9	7 59 32.15	2.1326	22 1 16.9	3.319
10	8 1 40.08	2.1317	21 57 54.6	3.424
11	8 3 47.95	2.1307	21 54 26.0	3.529
12	8 5 55.76	2.1297	21 50 51.1	3.633
13	8 8 3.51	2.1288	21 47 10.1	3.736
14	8 10 11.21	2.1278	21 43 22.8	3.840
15	8 12 18.85	2.1267	21 39 29.3	3.943
16	8 14 26.42	2.1257	21 35 29.6	4.046
17	8 16 33.93	2.1246	21 31 23.8	4.148
18	8 18 41.37	2.1234	21 27 11.8	4.251
19	8 20 48.74	2.1223	21 22 53.6	4.353
20	8 22 56.04	2.1212	21 18 29.4	4.454
21	8 25 3.28	2.1201	21 13 59.1	4.556
22	8 27 10.45	2.1188	21 9 22.7	4.657
23	8 29 17.54	2.1175	21 4 40.3	4.757
24	8 31 24.55	2.1162	N.20 59 51.8	4.858

MONDAY 3.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	8 31 24.55	2.1162	N.20 59 51.8	4.858
1	8 33 31.49	2.1150	20 54 57.3	4.958
2	8 35 38.35	2.1137	20 49 56.8	5.058
3	8 37 45.14	2.1125	20 44 50.3	5.158
4	8 39 51.85	2.1112	20 39 37.8	5.257
5	8 41 58.48	2.1099	20 34 19.4	5.356
6	8 44 5.04	2.1086	20 28 55.1	5.454
7	8 46 11.51	2.1072	20 23 24.9	5.552
8	8 48 17.90	2.1058	20 17 48.8	5.650
9	8 50 24.21	2.1044	20 12 6.9	5.747
10	8 52 30.43	2.1030	20 6 19.1	5.844
11	8 54 36.57	2.1017	20 0 25.6	5.940
12	8 56 42.63	2.1003	19 54 26.3	6.036
13	8 58 48.60	2.0988	19 48 21.2	6.132
14	9 0 54.49	2.0974	19 42 10.4	6.227
15	9 3 0.29	2.0960	19 35 53.9	6.322
16	9 5 6.01	2.0946	19 29 31.7	6.417
17	9 7 11.64	2.0932	19 23 3.9	6.511
18	9 9 17.19	2.0917	19 16 30.4	6.605
19	9 11 22.65	2.0902	19 9 51.3	6.698
20	9 13 28.02	2.0888	19 3 6.6	6.791
21	9 15 33.31	2.0874	18 56 16.4	6.884
22	9 17 38.51	2.0860	18 49 20.6	6.976
23	9 19 43.63	2.0846	N.18 42 19.3	7.067

TUESDAY 4.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	9 21 48.66	2.0831	N.18 35 12.6	7.158
1	9 23 53.60	2.0817	18 28 0.4	7.248
2	9 25 58.46	2.0802	18 20 42.8	7.338
3	9 28 3.23	2.0788	18 13 19.8	7.428
4	9 30 7.92	2.0774	18 5 51.4	7.517
5	9 32 12.52	2.0760	17 58 17.7	7.606
6	9 34 17.04	2.0746	17 50 38.7	7.694
7	9 36 21.47	2.0732	17 42 54.4	7.782
8	9 38 25.82	2.0718	17 35 4.9	7.869
9	9 40 30.09	2.0705	17 27 10.1	7.956
10	9 42 34.28	2.0691	17 19 10.1	8.042
11	9 44 38.39	2.0677	17 11 5.0	8.128
12	9 46 42.41	2.0664	17 2 54.7	8.214
13	9 48 46.35	2.0651	16 54 39.3	8.298
14	9 50 50.22	2.0638	16 46 18.9	8.382
15	9 52 54.01	2.0625	16 37 53.4	8.466
16	9 54 57.72	2.0613	16 29 22.9	8.550
17	9 57 1.36	2.0601	16 20 47.4	8.633
18	9 59 4.93	2.0588	16 12 7.0	8.715
19	10 1 8.42	2.0576	16 3 21.6	8.797
20	10 3 11.84	2.0564	15 54 31.4	8.878
21	10 5 15.19	2.0552	15 45 36.3	8.958
22	10 7 18.47	2.0541	15 36 36.4	9.038
23	10 9 21.68	2.0530	15 27 31.7	9.117
24	10 11 24.83	2.0519	N.15 18 22.3	9.197

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

WEDNESDAY 5.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	10 11 24.83	2.0519	N.15 18 22.3	9.197
1	10 13 27.91	2.0508	15 9 8.1	9.276
2	10 15 30.93	2.0497	14 59 49.2	9.353
3	10 17 33.88	2.0487	14 50 25.7	9.430
4	10 19 36.78	2.0478	14 40 57.6	9.507
5	10 21 39.62	2.0468	14 31 24.9	9.583
6	10 23 42.40	2.0459	14 21 47.6	9.659
7	10 25 45.13	2.0450	14 12 5.8	9.734
8	10 27 47.80	2.0441	14 2 19.5	9.809
9	10 29 50.42	2.0432	13 52 28.7	9.883
10	10 31 52.99	2.0424	13 42 33.5	9.956
11	10 33 55.51	2.0417	13 32 34.0	10.029
12	10 35 57.99	2.0409	13 22 30.1	10.101
13	10 38 0.42	2.0402	13 12 21.9	10.172
14	10 40 2.82	2.0396	13 2 9.4	10.243
15	10 42 5.18	2.0390	12 51 52.7	10.313
16	10 44 7.50	2.0384	12 41 31.8	10.383
17	10 46 9.79	2.0378	12 31 6.7	10.453
18	10 48 12.04	2.0372	12 20 37.4	10.522
19	10 50 14.26	2.0368	12 10 4.1	10.589
20	10 52 16.46	2.0365	11 59 26.7	10.656
21	10 54 18.64	2.0361	11 48 45.3	10.723
22	10 56 20.79	2.0357	11 37 59.9	10.789
23	10 58 22.92	2.0354	N.11 27 10.6	10.855

THURSDAY 6.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	11 0 25.04	2.0352	N.11 16 17.3	10.920
1	11 2 27.14	2.0349	11 5 20.2	10.984
2	11 4 29.23	2.0347	10 54 19.3	11.048
3	11 6 31.30	2.0345	10 43 14.5	11.111
4	11 8 33.37	2.0345	10 32 6.0	11.172
5	11 10 35.44	2.0345	10 20 53.8	11.233
6	11 12 37.51	2.0345	10 9 38.0	11.294
7	11 14 39.58	2.0346	9 58 18.5	11.355
8	11 16 41.66	2.0347	9 46 55.4	11.415
9	11 18 43.74	2.0348	9 35 28.7	11.474
10	11 20 45.83	2.0350	9 23 58.5	11.532
11	11 22 47.94	2.0352	9 12 24.9	11.589
12	11 24 50.06	2.0355	9 0 47.9	11.645
13	11 26 52.20	2.0359	8 49 7.5	11.701
14	11 28 54.37	2.0363	8 37 23.7	11.757
15	11 30 56.56	2.0367	8 25 36.6	11.812
16	11 32 58.78	2.0373	8 13 46.3	11.865
17	11 35 1.04	2.0379	8 1 52.8	11.918
18	11 37 3.33	2.0385	7 49 56.1	11.971
19	11 39 5.66	2.0392	7 37 56.3	12.022
20	11 41 8.03	2.0399	7 25 53.4	12.073
21	11 43 10.45	2.0407	7 13 47.5	12.123
22	11 45 12.92	2.0416	7 1 38.6	12.173
23	11 47 15.44	2.0424	6 49 26.7	12.222
24	11 49 18.01	2.0433	N. 6 37 11.9	12.270

FRIDAY 7.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	11 49 18.01	2.0433	N. 6 37 11.9	12.270
1	11 51 20.64	2.0444	6 24 54.3	12.317
2	11 53 23.34	2.0456	6 12 33.9	12.362
3	11 55 26.11	2.0467	6 0 10.8	12.407
4	11 57 28.94	2.0479	5 47 45.0	12.452
5	11 59 31.85	2.0492	5 35 16.5	12.497
6	12 1 34.84	2.0505	5 22 45.4	12.540
7	12 3 37.91	2.0518	5 10 11.7	12.582
8	12 5 41.06	2.0532	4 57 35.6	12.623
9	12 7 44.30	2.0547	4 44 57.0	12.663
10	12 9 47.63	2.0563	4 32 16.0	12.703
11	12 11 51.06	2.0580	4 19 32.6	12.742
12	12 13 54.59	2.0597	4 6 46.9	12.781
13	12 15 58.22	2.0614	3 53 58.9	12.818
14	12 18 1.96	2.0632	3 41 8.8	12.853
15	12 20 5.81	2.0651	3 28 16.6	12.888
16	12 22 9.77	2.0670	3 15 22.3	12.922
17	12 24 13.85	2.0690	3 2 26.0	12.956
18	12 26 18.05	2.0711	2 49 27.6	12.989
19	12 28 22.38	2.0733	2 36 27.3	13.020
20	12 30 26.84	2.0755	2 23 25.2	13.050
21	12 32 31.44	2.0778	2 10 21.3	13.079
22	12 34 36.17	2.0801	1 57 15.7	13.108
23	12 36 41.05	2.0825	N. 1 44 8.4	13.136

SATURDAY 8.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	12 38 46.07	2.0849	N. 1 30 59.4	13.163
1	12 40 51.24	2.0875	1 17 48.9	13.188
2	12 42 56.57	2.0902	1 4 36.9	13.213
3	12 45 2.06	2.0928	0 51 23.4	13.237
4	12 47 7.71	2.0955	0 38 8.5	13.259
5	12 49 13.52	2.0983	0 24 52.3	13.280
6	12 51 19.50	2.1012	N. 0 11 34.9	13.300
7	12 53 25.66	2.1042	S. 0 1 43.7	13.320
8	12 55 32.00	2.1072	0 15 3.5	13.338
9	12 57 38.52	2.1103	0 28 24.3	13.355
10	12 59 45.23	2.1134	0 41 46.1	13.372
11	13 1 52.13	2.1166	0 55 8.9	13.387
12	13 3 59.23	2.1199	1 8 32.5	13.400
13	13 6 6.52	2.1233	1 21 56.9	13.412
14	13 8 14.02	2.1268	1 35 22.0	13.423
15	13 10 21.73	2.1303	1 48 47.7	13.433
16	13 12 29.65	2.1338	2 2 14.0	13.443
17	13 14 37.79	2.1375	2 15 40.9	13.452
18	13 16 46.15	2.1412	2 29 8.2	13.458
19	13 18 54.73	2.1449	2 42 35.9	13.463
20	13 21 3.53	2.1486	2 56 3.8	13.467
21	13 23 12.56	2.1525	3 9 31.9	13.470
22	13 25 21.83	2.1566	3 23 0.2	13.472
23	13 27 31.35	2.1607	3 36 28.5	13.472
24	13 29 41.11	2.1648	S. 3 49 56.8	13.471

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SUNDAY 9.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	13 29 41.11	2.1648	S. 3 49 56.8	13.471
1	13 31 51.12	2.1689	4 3 25.0	13.468
2	13 34 1.38	2.1732	4 16 53.0	13.465
3	13 36 11.90	2.1775	4 30 20.8	13.460
4	13 38 22.68	2.1818	4 43 48.2	13.453
5	13 40 33.72	2.1863	4 57 15.2	13.446
6	13 42 45.03	2.1908	5 10 41.7	13.437
7	13 44 56.62	2.1954	5 24 7.6	13.426
8	13 47 8.48	2.2000	5 37 32.8	13.414
9	13 49 20.62	2.2048	5 50 57.3	13.402
10	13 51 33.05	2.2096	6 4 21.0	13.387
11	13 53 45.77	2.2144	6 17 43.7	13.370
12	13 55 58.77	2.2192	6 31 5.4	13.352
13	13 58 12.07	2.2242	6 44 26.0	13.333
14	14 0 25.67	2.2292	6 57 45.4	13.312
15	14 2 39.58	2.2343	7 11 3.5	13.290
16	14 4 53.79	2.2394	7 24 20.2	13.267
17	14 7 8.31	2.2446	7 37 35.5	13.242
18	14 9 23.15	2.2499	7 50 49.2	13.215
19	14 11 38.30	2.2552	8 4 1.3	13.187
20	14 13 53.77	2.2606	8 17 11.6	13.156
21	14 16 9.57	2.2661	8 30 20.0	13.124
22	14 18 25.70	2.2716	8 43 26.5	13.092
23	14 20 42.16	2.2771	S. 8 56 31.0	13.057

MONDAY 10.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	14 22 58.95	2.2827	S. 9 9 33.3	13.020
1	14 25 16.08	2.2883	9 22 33.4	12.981
2	14 27 33.55	2.2940	9 35 31.2	12.942
3	14 29 51.36	2.2998	9 48 26.5	12.901
4	14 32 9.52	2.3056	10 1 19.3	12.858
5	14 34 28.03	2.3114	10 14 9.5	12.813
6	14 36 46.89	2.3173	10 26 56.9	12.767
7	14 39 6.11	2.3233	10 39 41.5	12.718
8	14 41 25.69	2.3293	10 52 23.1	12.668
9	14 43 45.63	2.3353	11 5 1.7	12.617
10	14 46 5.93	2.3413	11 17 37.1	12.563
11	14 48 26.59	2.3474	11 30 9.2	12.508
12	14 50 47.62	2.3536	11 42 38.0	12.451
13	14 53 9.02	2.3598	11 55 3.3	12.392
14	14 55 30.80	2.3661	12 7 25.0	12.331
15	14 57 52.95	2.3723	12 19 43.0	12.268
16	15 0 15.48	2.3786	12 31 57.2	12.204
17	15 2 38.38	2.3849	12 44 7.5	12.137
18	15 5 1.66	2.3912	12 56 13.7	12.069
19	15 7 25.32	2.3976	13 8 15.8	12.000
20	15 9 49.37	2.4040	13 20 13.7	11.929
21	15 12 13.80	2.4103	13 32 7.3	11.856
22	15 14 38.61	2.4167	13 43 56.4	11.780
23	15 17 3.81	2.4232	13 55 40.9	11.702
24	15 19 29.40	2.4297	S. 14 7 20.6	11.622

TUESDAY 11.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	15 19 29.40	2.4297	S. 14 7 20.6	11.622
1	15 21 55.38	2.4362	14 18 55.5	11.542
2	15 24 21.74	2.4426	14 30 25.6	11.460
3	15 26 48.49	2.4491	14 41 50.7	11.375
4	15 29 15.63	2.4556	14 53 10.6	11.287
5	15 31 43.16	2.4622	15 4 25.2	11.198
6	15 34 11.09	2.4687	15 15 34.4	11.108
7	15 36 39.41	2.4752	15 26 38.2	11.016
8	15 39 8.11	2.4816	15 37 36.3	10.921
9	15 41 37.20	2.4881	15 48 28.7	10.825
10	15 44 6.68	2.4946	15 59 15.3	10.727
11	15 46 36.55	2.5010	16 9 55.9	10.627
12	15 49 6.80	2.5074	16 20 30.5	10.525
13	15 51 37.44	2.5138	16 30 58.9	10.421
14	15 54 8.46	2.5202	16 41 21.0	10.316
15	15 56 39.87	2.5266	16 51 36.8	10.208
16	15 59 11.66	2.5330	17 1 46.0	10.098
17	16 1 43.83	2.5393	17 11 48.6	9.987
18	16 4 16.38	2.5456	17 21 44.5	9.875
19	16 6 49.30	2.5519	17 31 33.6	9.760
20	16 9 22.60	2.5581	17 41 15.7	9.643
21	16 11 56.27	2.5642	17 50 50.7	9.524
22	16 14 30.31	2.5703	18 0 18.6	9.404
23	16 17 4.71	2.5764	S. 18 9 39.2	9.281

WEDNESDAY 12.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	16 19 39.48	2.5825	S. 18 18 52.3	9.156
1	16 22 14.61	2.5884	18 27 57.9	9.031
2	16 24 50.09	2.5942	18 36 56.0	8.904
3	16 27 25.92	2.6001	18 45 46.4	8.775
4	16 30 2.10	2.6059	18 54 29.0	8.644
5	16 32 38.63	2.6117	19 3 3.7	8.511
6	16 35 15.50	2.6173	19 11 30.3	8.376
7	16 37 52.71	2.6229	19 19 48.8	8.240
8	16 40 30.25	2.6283	19 27 59.1	8.102
9	16 43 8.11	2.6337	19 36 1.1	7.963
10	16 45 46.29	2.6390	19 43 54.7	7.822
11	16 48 24.79	2.6442	19 51 39.7	7.678
12	16 51 3.60	2.6494	19 59 16.1	7.534
13	16 53 42.72	2.6544	20 6 43.8	7.388
14	16 56 22.13	2.6593	20 14 2.7	7.242
15	16 59 1.84	2.6642	20 21 12.8	7.093
16	17 1 41.84	2.6690	20 28 13.9	6.943
17	17 4 22.12	2.6736	20 35 6.0	6.792
18	17 7 2.67	2.6781	20 41 48.9	6.638
19	17 9 43.49	2.6825	20 48 22.6	6.484
20	17 12 24.57	2.6868	20 54 47.0	6.328
21	17 15 5.90	2.6909	21 1 2.0	6.171
22	17 17 47.48	2.6949	21 7 7.5	6.012
23	17 20 29.29	2.6988	21 13 3.5	5.853
24	17 23 11.33	2.7026	S. 21 18 49.9	5.692

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

THURSDAY 13.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	17 23 11.33	2.7026	S.21 18 49.9	5.692
1	17 25 53.60	2.7063	21 24 26.6	5.531
2	17 28 36.08	2.7098	21 29 53.6	5.368
3	17 31 18.77	2.7132	21 35 10.8	5.204
4	17 34 1.66	2.7164	21 40 18.1	5.039
5	17 36 44.74	2.7195	21 45 15.5	4.872
6	17 39 28.00	2.7224	21 50 2.8	4.705
7	17 42 11.43	2.7252	21 54 40.1	4.537
8	17 44 55.03	2.7279	21 59 7.3	4.369
9	17 47 38.78	2.7303	22 3 24.4	4.200
10	17 50 22.67	2.7327	22 7 31.3	4.029
11	17 53 6.70	2.7349	22 11 27.9	3.858
12	17 55 50.86	2.7370	22 15 14.2	3.686
13	17 58 35.14	2.7388	22 18 50.2	3.513
14	18 1 19.52	2.7405	22 22 15.8	3.340
15	18 4 4.00	2.7421	22 25 31.0	3.166
16	18 6 48.57	2.7435	22 28 35.7	2.991
17	18 9 33.22	2.7447	22 31 29.9	2.817
18	18 12 17.93	2.7457	22 34 13.7	2.642
19	18 15 2.70	2.7466	22 36 46.9	2.466
20	18 17 47.52	2.7473	22 39 9.6	2.290
21	18 20 32.38	2.7479	22 41 21.7	2.113
22	18 23 17.27	2.7482	22 43 23.2	1.937
23	18 26 2.17	2.7484	S.22 45 14.1	1.761

FRIDAY 14.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	18 28 47.08	2.7485	S.22 46 54.5	1.584
1	18 31 31.99	2.7484	22 48 24.2	1.407
2	18 34 16.89	2.7481	22 49 43.3	1.229
3	18 37 1.76	2.7476	22 50 51.7	1.052
4	18 39 46.60	2.7470	22 51 49.5	0.875
5	18 42 31.40	2.7462	22 52 36.7	0.698
6	18 45 16.14	2.7452	22 53 13.3	0.522
7	18 48 0.82	2.7440	22 53 39.3	0.345
8	18 50 45.42	2.7427	22 53 54.7	− 0.168
9	18 53 29.94	2.7412	22 53 59.4	+ 0.009
10	18 56 14.36	2.7395	22 53 53.6	0.184
11	18 58 58.68	2.7377	22 53 37.3	0.360
12	19 1 42.88	2.7357	22 53 10.4	0.536
13	19 4 26.96	2.7335	22 52 33.0	0.710
14	19 7 10.90	2.7312	22 51 45.2	0.884
15	19 9 54.70	2.7287	22 50 46.9	1.058
16	19 12 38.34	2.7260	22 49 38.2	1.232
17	19 15 21.82	2.7232	22 48 19.1	1.404
18	19 18 5.13	2.7203	22 46 49.7	1.576
19	19 20 48.26	2.7172	22 45 10.0	1.747
20	19 23 31.19	2.7138	22 43 20.0	1.918
21	19 26 13.92	2.7104	22 41 19.8	2.088
22	19 28 56.44	2.7069	22 39 9.5	2.257
23	19 31 38.75	2.7032	22 36 49.0	2.425
24	19 34 20.83	2.6993	S.22 34 18.5	2.592

SATURDAY 15.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	19 34 20.83	2.6993	S.22 34 18.5	2.592
1	19 37 2.67	2.6953	22 31 38.0	2.758
2	19 39 44.27	2.6912	22 28 47.5	2.923
3	19 42 25.61	2.6868	22 25 47.2	3.088
4	19 45 6.69	2.6824	22 22 37.0	3.252
5	19 47 47.50	2.6778	22 19 17.0	3.413
6	19 50 28.03	2.6731	22 15 47.4	3.574
7	19 53 8.28	2.6683	22 12 8.1	3.735
8	19 55 48.23	2.6633	22 8 19.2	3.893
9	19 58 27.88	2.6583	22 4 20.9	4.050
10	20 1 7.23	2.6532	22 0 13.2	4.207
11	20 3 46.27	2.6480	21 55 56.1	4.363
12	20 6 24.99	2.6426	21 51 29.7	4.517
13	20 9 3.38	2.6371	21 46 54.1	4.669
14	20 11 41.44	2.6314	21 42 9.4	4.820
15	20 14 19.15	2.6257	21 37 15.7	4.970
16	20 16 56.52	2.6199	21 32 13.0	5.119
17	20 19 33.54	2.6140	21 27 1.4	5.266
18	20 22 10.20	2.6080	21 21 41.1	5.411
19	20 24 46.50	2.6019	21 16 12.1	5.556
20	20 27 22.43	2.5957	21 10 34.4	5.699
21	20 29 57.99	2.5895	21 4 48.2	5.840
22	20 32 33.17	2.5832	20 58 53.6	5.980
23	20 35 7.97	2.5768	S.20 52 50.6	6.118

SUNDAY 16.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	20 37 42.38	2.5703	S.20 46 39.4	6.255
1	20 40 16.40	2.5637	20 40 20.0	6.391
2	20 42 50.02	2.5571	20 33 52.5	6.524
3	20 45 23.25	2.5505	20 27 17.1	6.656
4	20 47 56.08	2.5437	20 20 33.8	6.787
5	20 50 28.50	2.5369	20 13 42.7	6.916
6	20 53 0.51	2.5301	20 6 43.9	7.043
7	20 55 32.11	2.5232	19 59 37.5	7.169
8	20 58 3.29	2.5163	19 52 23.6	7.293
9	21 0 34.06	2.5093	19 45 2.3	7.416
10	21 3 4.41	2.5022	19 37 33.7	7.537
11	21 5 34.33	2.4952	19 29 57.8	7.657
12	21 8 3.83	2.4881	19 22 14.9	7.774
13	21 10 32.90	2.4810	19 14 25.0	7.890
14	21 13 1.55	2.4739	19 6 28.1	8.005
15	21 15 29.77	2.4667	18 58 24.4	8.117
16	21 17 57.56	2.4595	18 50 14.0	8.228
17	21 20 24.91	2.4523	18 41 57.0	8.337
18	21 22 51.83	2.4451	18 33 33.5	8.445
19	21 25 18.32	2.4378	18 25 3.6	8.552
20	21 27 44.37	2.4306	18 16 27.3	8.657
21	21 30 9.99	2.4233	18 7 44.8	8.759
22	21 32 35.17	2.4161	17 58 56.2	8.860
23	21 34 59.92	2.4088	17 50 1.6	8.959
24	21 37 24.23	2.4016	S.17 41 1.1	9.057

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	MONDAY 17.					WEDNESDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	21 37 24.23	2.4016	S. 17 41 1.1	9.057	0	23 24 50.06	2.0925	S. 9 3 7.2	11.971
1	21 39 48.11	2.3943	17 31 54.8	9.153	1	23 26 55.46	2.0874	8 51 8.1	11.999
2	21 42 11.55	2.3870	17 22 42.7	9.248	2	23 29 0.55	2.0823	8 39 7.3	12.026
3	21 44 34.56	2.3798	17 13 25.0	9.341	3	23 31 5.34	2.0774	8 27 5.0	12.051
4	21 46 57.13	2.3726	17 4 1.8	9.432	4	23 33 9.84	2.0726	8 15 1.2	12.076
5	21 49 19.27	2.3654	16 54 33.1	9.522	5	23 35 14.05	2.0678	8 2 55.9	12.100
6	21 51 40.98	2.3582	16 44 59.1	9.610	6	23 37 17.98	2.0631	7 50 49.2	12.122
7	21 54 2.26	2.3511	16 35 19.9	9.697	7	23 39 21.62	2.0584	7 38 41.2	12.143
8	21 56 23.11	2.3439	16 25 35.5	9.782	8	23 41 24.99	2.0538	7 26 32.0	12.163
9	21 58 43.52	2.3367	16 15 46.1	9.864	9	23 43 28.08	2.0492	7 14 21.6	12.183
10	22 1 3.51	2.3296	16 5 51.8	9.946	10	23 45 30.90	2.0448	7 2 10.1	12.201
11	22 3 23.07	2.3225	15 55 52.6	10.027	11	23 47 33.46	2.0405	6 49 57.5	12.217
12	22 5 42.21	2.3155	15 45 48.6	10.106	12	23 49 35.76	2.0362	6 37 44.0	12.233
13	22 8 0.93	2.3084	15 35 39.9	10.182	13	23 51 37.80	2.0319	6 25 29.5	12.249
14	22 10 19.22	2.3013	15 25 26.7	10.257	14	23 53 39.59	2.0277	6 13 14.1	12.263
15	22 12 37.09	2.2944	15 15 9.1	10.330	15	23 55 41.13	2.0236	6 0 57.9	12.277
16	22 14 54.55	2.2876	15 4 47.1	10.403	16	23 57 42.42	2.0196	5 48 40.9	12.288
17	22 17 11.60	2.2807	14 54 20.7	10.475	17	23 59 43.48	2.0157	5 36 23.3	12.298
18	22 19 28.23	2.2738	14 43 50.1	10.544	18	0 1 44.30	2.0118	5 24 5.1	12.308
19	22 21 44.45	2.2669	14 33 15.4	10.612	19	0 3 44.89	2.0080	5 11 46.3	12.318
20	22 24 0.26	2.2602	14 22 36.7	10.677	20	0 5 45.26	2.0042	4 59 26.9	12.327
21	22 26 15.67	2.2535	14 11 54.2	10.741	21	0 7 45.40	2.0006	4 47 7.1	12.334
22	22 28 30.68	2.2468	14 1 7.8	10.805	22	0 9 45.33	1.9970	4 34 46.9	12.340
23	22 30 45.29	2.2402	S. 13 50 17.6	10.867	23	0 11 45.04	1.9934	S. 4 22 26.3	12.346
	TUESDAY 18.					THURSDAY 20.			
0	22 32 59.50	2.2336	S. 13 39 23.7	10.928	0	0 13 44.54	1.9900	S. 4 10 5.4	12.350
1	22 35 13.32	2.2271	13 28 26.2	10.987	1	0 15 43.84	1.9867	3 57 44.3	12.353
2	22 37 26.75	2.2206	13 17 25.3	11.043	2	0 17 42.94	1.9833	3 45 23.0	12.356
3	22 39 39.79	2.2141	13 6 21.0	11.099	3	0 19 41.84	1.9800	3 33 1.5	12.358
4	22 41 52.44	2.2077	12 55 13.4	11.154	4	0 21 40.54	1.9768	3 20 40.0	12.359
5	22 44 4.71	2.2013	12 44 2.5	11.207	5	0 23 39.06	1.9738	3 8 18.4	12.360
6	22 46 16.60	2.1951	12 32 48.5	11.259	6	0 25 37.40	1.9708	2 55 56.8	12.359
7	22 48 28.12	2.1889	12 21 31.4	11.310	7	0 27 35.56	1.9678	2 43 35.3	12.357
8	22 50 39.27	2.1827	12 10 11.3	11.359	8	0 29 33.54	1.9649	2 31 14.0	12.354
9	22 52 50.05	2.1766	11 58 48.3	11.407	9	0 31 31.35	1.9621	2 18 52.8	12.351
10	22 55 0.46	2.1705	11 47 22.5	11.453	10	0 33 29.00	1.9594	2 6 31.8	12.347
11	22 57 10.51	2.1646	11 35 53.9	11.498	11	0 35 26.48	1.9567	1 54 11.1	12.342
12	22 59 20.21	2.1587	11 24 22.7	11.542	12	0 37 23.80	1.9541	1 41 50.8	12.336
13	23 1 29.55	2.1528	11 12 48.9	11.585	13	0 39 20.97	1.9516	1 29 30.8	12.330
14	23 3 38.54	2.1470	11 1 12.5	11.627	14	0 41 17.99	1.9491	1 17 11.2	12.322
15	23 5 47.19	2.1412	10 49 33.7	11.666	15	0 43 14.86	1.9467	1 4 52.1	12.314
16	23 7 55.49	2.1356	10 37 52.6	11.704	16	0 45 11.59	1.9444	0 52 33.5	12.305
17	23 10 3.46	2.1300	10 26 9.2	11.742	17	0 47 8.19	1.9421	0 40 15.5	12.296
18	23 12 11.09	2.1244	10 14 23.5	11.779	18	0 49 4.65	1.9399	0 27 58.0	12.286
19	23 14 18.39	2.1189	10 2 35.7	11.813	19	0 51 0.98	1.9378	0 15 41.2	12.274
20	23 16 25.36	2.1135	9 50 45.9	11.847	20	0 52 57.19	1.9358	S. 0 3 25.1	12.262
21	23 18 32.01	2.1082	9 38 54.0	11.881	21	0 54 53.28	1.9338	N. 0 8 50.2	12.249
22	23 20 38.34	2.1029	9 27 0.2	11.912	22	0 56 49.25	1.9319	0 21 4.7	12.235
23	23 22 44.36	2.0977	9 15 4.6	11.942	23	0 58 45.11	1.9301	0 33 18.4	12.221
24	23 24 50.06	2.0925	S. 9 3 7.2	11.971	24	1 0 40.86	1.9283	N. 0 45 31.2	12.206

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	FRIDAY 21.					**SUNDAY 23.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	1 0 40.86	1.9283	N. 0 45 31.2	12.206	0	2 32 22.44	1.9143	N.10 0 56.2	10.683
1	1 2 36.50	1.9265	0 57 43.1	12.190	1	2 34 17.33	1.9153	10 11 35.8	10.636
2	1 4 32.04	1.9249	1 9 54.0	12.173	2	2 36 12.28	1.9164	10 22 12.5	10.588
3	1 6 27.49	1.9233	1 22 3.9	12.157	3	2 38 7.30	1.9176	10 32 46.3	10.539
4	1 8 22.84	1.9218	1 34 12.8	12.139	4	2 40 2.39	1.9187	10 43 17.2	10.490
5	1 10 18.11	1.9204	1 46 20.6	12.120	5	2 41 57.55	1.9199	10 53 45.1	10.440
6	1 12 13.29	1.9190	1 58 27.2	12.100	6	2 43 52.78	1.9212	11 4 10.0	10.390
7	1 14 8.39	1.9177	2 10 32.6	12.080	7	2 45 48.09	1.9225	11 14 31.9	10.338
8	1 16 3.41	1.9164	2 22 36.8	12.060	8	2 47 43.48	1.9238	11 24 50.6	10.286
9	1 17 58.36	1.9152	2 34 39.8	12.039	9	2 49 38.94	1.9251	11 35 6.2	10.233
10	1 19 53.24	1.9141	2 46 41.5	12.017	10	2 51 34.49	1.9266	11 45 18.6	10.180
11	1 21 48.05	1.9130	2 58 41.8	11.993	11	2 53 30.13	1.9280	11 55 27.8	10.127
12	1 23 42.80	1.9120	3 10 40.6	11.969	12	2 55 25.85	1.9294	12 5 33.8	10.073
13	1 25 37.49	1.9111	3 22 38.0	11.945	13	2 57 21.66	1.9310	12 15 36.6	10.018
14	1 27 32.13	1.9102	3 34 34.0	11.921	14	2 59 17.57	1.9326	12 25 36.0	9.962
15	1 29 26.72	1.9094	3 46 28.5	11.895	15	3 1 13.57	1.9342	12 35 30.0	9.905
16	1 31 21.26	1.9087	3 58 21.4	11.868	16	3 3 9.67	1.9358	12 45 24.6	9.848
17	1 33 15.76	1.9079	4 10 12.7	11.842	17	3 5 5.87	1.9375	12 55 13.8	9.791
18	1 35 10.21	1.9072	4 22 2.4	11.814	18	3 7 2.17	1.9392	13 4 59.6	9.734
19	1 37 4.63	1.9067	4 33 50.4	11.785	19	3 8 58.57	1.9409	13 14 41.9	9.675
20	1 38 59.02	1.9062	4 45 36.6	11.756	20	3 10 55.08	1.9427	13 24 20.6	9.615
21	1 40 53.38	1.9057	4 57 21.1	11.727	21	3 12 51.70	1.9446	13 33 55.7	9.555
22	1 42 47.71	1.9053	5 9 3.8	11.697	22	3 14 48.43	1.9464	13 43 27.2	9.495
23	1 44 42.02	1.9050	N. 5 20 44.7	11.666	23	3 16 45.27	1.9483	N.13 52 55.1	9.434
	SATURDAY 22.					**MONDAY 24.**			
0	1 46 36.31	1.9047	N. 5 32 23.7	11.634	0	3 18 42.22	1.9502	N.14 2 19.3	9.372
1	1 48 30.58	1.9045	5 44 0.8	11.602	1	3 20 39.29	1.9521	14 11 39,8	9.310
2	1 50 24.85	1.9044	5 55 35.9	11.569	2	3 22 36.47	1.9540	14 20 56.5	9.247
3	1 52 19.11	1.9043	6 7 9.0	11.535	3	3 24 33.77	1.9560	14 30 9.4	9.183
4	1 54 13.36	1.9042	6 18 40.1	11.501	4	3 26 31.19	1.9580	14 39 18.4	9.119
5	1 56 7.61	1.9042	6 30 9.1	11.467	5	3 28 28.73	1.9601	14 48 23.6	9.054
6	1 58 1.87	1.9043	6 41 36.1	11.432	6	3 30 26.40	1.9622	14 57 24.9	8.988
7	1 59 56.13	1.9044	6 53 0.9	11.395	7	3 32 24.19	1.9643	15 6 22.2	8.922
8	2 1 50.40	1.9046	7 4 23.5	11.357	8	3 34 22.11	1.9664	15 15 15.5	8.856
9	2 3 44.68	1.9048	7 15 43.8	11.319	9	3 36 20.16	1.9686	15 24 4.9	8.789
10	2 5 38.97	1.9050	7 27 1.8	11.282	10	3 38 18.34	1.9707	15 32 50.2	8.721
11	2 7 33.28	1.9054	7 38 17.6	11.244	11	3 40 16.64	1.9728	15 41 31.4	8.652
12	2 9 27.62	1.9058	7 49 31.1	11.205	12	3 42 15.07	1.9750	15 50 8.4	8.582
13	2 11 21.98	1.9062	8 0 42.2	11.164	13	3 44 13.64	1.9772	15 58 41.2	8.512
14	2 13 16.37	1.9067	8 11 50.8	11.123	14	3 46 12.34	1.9795	16 7 9.9	8.443
15	2 15 10.79	1.9072	8 22 57.0	11.082	15	3 48 11.18	1.9818	16 15 34.4	8.372
16	2 17 5.24	1.9078	8 34 0.7	11.041	16	3 50 10.16	1.9841	16 23 54.6	8.300
17	2 18 59.73	1.9085	8 45 1.9	10.998	17	3 52 9.27	1.9864	16 32 10.4	8.227
18	2 20 54.26	1.9092	8 56 0.5	10.955	18	3 54 8.52	1.9887	16 40 21.9	8.155
19	2 22 48.83	1.9099	9 6 56.5	10.912	19	3 56 7.91	1.9910	16 48 29.0	8.082
20	2 24 43.45	1.9107	9 17 49.9	10.868	20	3 58 7.44	1.9933	16 56 31.7	8.008
21	2 26 38.12	1.9116	9 28 40.6	10.823	21	4 0 7.11	1.9957	17 4 29.9	7.933
22	2 28 32.84	1.9124	9 39 28.6	10.777	22	4 2 6.93	1.9981	17 12 23.6	7.858
23	2 30 27.61	1.9133	9 50 13.8	10.730	23	4 4 6.89	2.0005	17 20 12.8	7.782
24	2 32 22.44	1.9143	N.10 0 56.2	10.683	24	4 6 6.99	2.0029	N.17 27 57.4	7.705

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	TUESDAY 25.					THURSDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	4 6 6.99	2.0029	N.17 27 57.4	7.705	0	5 44 59.51	2.1120	N.21 59 2.2	3.392
1	4 8 7.24	2.0053	17 35 37.4	7.628	1	5 47 6.28	2.1137	22 2 22.7	3.291
2	4 10 7.63	2.0077	17 43 12.8	7.551	2	5 49 13.16	2.1155	22 5 37.1	3.190
3	4 12 8.16	2.0101	17 50 43.5	7.472	3	5 51 20.14	2.1172	22 8 45.5	3.088
4	4 14 8.84	2.0126	17 58 9.5	7.393	4	5 53 27.22	2.1188	22 11 47.7	2.985
5	4 16 9.67	2.0150	18 5 30.7	7.313	5	5 55 34.40	2.1205	22 14 43.7	2.882
6	4 18 10.64	2.0174	18 12 47.1	7.233	6	5 57 41.68	2.1221	22 17 33.6	2.780
7	4 20 11.76	2.0199	18 19 58.7	7.153	7	5 59 49.05	2.1236	22 20 17.3	2.677
8	4 22 13.03	2.0223	18 27 5.5	7.072	8	6 1 56.51	2.1251	22 22 54.8	2.573
9	4 24 14.44	2.0247	18 34 7.4	6.991	9	6 4 4.06	2.1266	22 25 26.0	2.468
10	4 26 16.00	2.0272	18 41 4.4	6.909	10	6 6 11.70	2.1280	22 27 51.0	2.364
11	4 28 17.70	2.0296	18 47 56.4	6.826	11	6 8 19.42	2.1294	22 30 9.7	2.260
12	4 30 19.55	2.0321	18 54 43.5	6.742	12	6 10 27.23	2.1308	22 32 22.2	2.156
13	4 32 21.55	2.0346	19 1 25.5	6.657	13	6 12 35.12	2.1321	22 34 28.4	2.050
14	4 34 23.70	2.0370	19 8 2.4	6.573	14	6 14 43.08	2.1333	22 36 28.2	1.944
15	4 36 25.99	2.0394	19 14 34.3	6.489	15	6 16 51.11	2.1345	22 38 21.7	1.839
16	4 38 28.43	2.0419	19 21 1.1	6.403	16	6 18 59.22	2.1357	22 40 8.9	1.733
17	4 40 31.02	2.0443	19 27 22.7	6.316	17	6 21 7.40	2.1369	22 41 49.7	1.626
18	4 42 33.75	2.0467	19 33 39.0	6.229	18	6 23 15.65	2.1380	22 43 24.2	1.522
19	4 44 36.63	2.0492	19 39 50.1	6.142	19	6 25 23.96	2.1390	22 44 52.3	1.415
20	4 46 39.65	2.0516	19 45 56.0	6.054	20	6 27 32.33	2.1400	22 46 14.0	1.308
21	4 48 42.82	2.0540	19 51 56.6	5.966	21	6 29 40.76	2.1410	22 47 29.3	1.201
22	4 50 46.13	2.0564	19 57 51.9	5.877	22	6 31 49.25	2.1419	22 48 38.2	1.094
23	4 52 49.59	2.0588	N.20 3 41.8	5.787	23	6 33 57.79	2.1428	N.22 49 40.6	0.987
	WEDNESDAY 26.					FRIDAY 28.			
0	4 54 53.19	2.0612	N.20 9 26.3	5.697	0	6 36 6.38	2.1436	N.22 50 36.6	0.880
1	4 56 56.93	2.0635	20 15 5.4	5.606	1	6 38 15.02	2.1444	22 51 26.2	0.772
2	4 59 0.81	2.0659	20 20 39.0	5.515	2	6 40 23.70	2.1451	22 52 9.3	0.664
3	5 1 4.84	2.0682	20 26 7.2	5.424	3	6 42 32.43	2.1457	22 52 45.9	0.557
4	5 3 9.00	2.0705	20 31 29.9	5.332	4	6 44 41.19	2.1463	22 53 16.1	0.449
5	5 5 13.30	2.0727	20 36 47.0	5.239	5	6 46 49.99	2.1470	22 53 39.8	0.341
6	5 7 17.73	2.0750	20 41 58.6	5.146	6	6 48 58.83	2.1476	22 53 57.0	0.232
7	5 9 22.30	2.0773	20 47 4.6	5.052	7	6 51 7.70	2.1480	22 54 7.7	0.124
8	5 11 27.01	2.0796	20 52 4.9	4.958	8	6 53 16.59	2.1484	22 54 11.9	+ 0.017
9	5 13 31.85	2.0818	20 56 59.6	4.864	9	6 55 25.51	2.1488	22 54 9.7	− 0.091
10	5 15 36.82	2.0839	21 1 48.6	4.769	10	6 57 34.45	2.1491	22 54 1.0	0.200
11	5 17 41.92	2.0861	21 6 31.9	4.673	11	6 59 43.41	2.1494	22 53 45.7	0.308
12	5 19 47.16	2.0883	21 11 9.4	4.577	12	7 1 52.38	2.1497	22 53 24.0	0.416
13	5 21 52.52	2.0904	21 15 41.2	4.481	13	7 4 1.37	2.1499	22 52 55.8	0.525
14	5 23 58.01	2.0925	21 20 7.2	4.384	14	7 6 10.37	2.1501	22 52 21.0	0.634
15	5 26 3.62	2.0946	21 24 27.3	4.287	15	7 8 19.38	2.1502	22 51 39.7	0.742
16	5 28 9.36	2.0967	21 28 41.6	4.189	16	7 10 28.39	2.1502	22 50 51.9	0.851
17	5 30 15.22	2.0987	21 32 50.0	4.091	17	7 12 37.40	2.1502	22 49 57.6	0.959
18	5 32 21.20	2.1007	21 36 52.5	3.992	18	7 14 46.42	2.1502	22 48 56.8	1.067
19	5 34 27.30	2.1027	21 40 49.0	3.893	19	7 16 55.43	2.1501	22 47 49.5	1.176
20	5 36 33.52	2.1046	21 44 39.6	3.794	20	7 19 4.43	2.1499	22 46 35.7	1.284
21	5 38 39.85	2.1064	21 48 24.3	3.695	21	7 21 13.42	2.1498	22 45 15.4	1.392
22	5 40 46.29	2.1083	21 52 3.0	3.594	22	7 23 22.40	2.1496	22 43 48.6	1.501
23	5 42 52.84	2.1102	21 55 35.6	3.493	23	7 25 31.37	2.1493	22 42 15.3	1.608
24	5 44 59.51	2.1120	N.21 59 2.2	3.392	24	7 27 40.32	2.1490	N.22 40 35.6	1.716

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SATURDAY 29.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	7 27 40.32	2.1490	N.22 40 35.6	1.716
1	7 29 49.25	2.1486	22 38 49.4	1.824
2	7 31 58.15	2.1482	22 36 56.7	1.932
3	7 34 7.03	2.1477	22 34 57.5	2.040
4	7 36 15.88	2.1472	22 32 51.9	2.147
5	7 38 24.70	2.1467	22 30 39.8	2.255
6	7 40 33.48	2.1461	22 28 21.3	2.362
7	7 42 42.23	2.1455	22 25 56.4	2.469
8	7 44 50.94	2.1448	22 23 25.1	2.576
9	7 46 59.61	2.1441	22 20 47.3	2.683
10	7 49 8.23	2.1433	22 18 3.1	2.789
11	7 51 16.81	2.1426	22 15 12.6	2.895
12	7 53 25.34	2.1418	22 12 15.7	3.002
13	7 55 33.82	2.1409	22 9 12.4	3.108
14	7 57 42.24	2.1399	22 6 2.8	3.213
15	7 59 50.61	2.1390	22 2 46.9	3.318
16	8 1 58.92	2.1380	21 59 24.7	3.423
17	8 4 7.17	2.1369	21 55 56.2	3.528
18	8 6 15.35	2.1358	21 52 21.4	3.633
19	8 8 23.47	2.1347	21 48 40.3	3.737
20	8 10 31.52	2.1336	21 44 53.0	3.841
21	8 12 39.50	2.1324	21 40 59.4	3.945
22	8 14 47.41	2.1312	21 36 59.6	4.048
23	8 16 55.25	2.1300	N.21 32 53.6	4.151

SUNDAY 30.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	8 19 3.01	2.1287	N.21 28 41.5	4.253
1	8 21 10.69	2.1274	21 24 23.2	4.356
2	8 23 18.29	2.1261	21 19 58.8	4.459
3	8 25 25.82	2.1247	21 15 28.2	4.561
4	8 27 33.26	2.1233	21 10 51.5	4.662
5	8 29 40.62	2.1219	21 6 8.8	4.762
6	8 31 47.89	2.1204	21 1 20.1	4.862
7	8 33 55.07	2.1189	20 56 25.3	4.963
8	8 36 2.16	2.1175	20 51 24.5	5.063
9	8 38 9.17	2.1160	20 46 17.7	5.162
10	8 40 16.08	2.1144	20 41 5.0	5.262
11	8 42 22.89	2.1128	20 35 46.3	5.361
12	8 44 29.61	2.1112	20 30 21.7	5.459
13	8 46 36.23	2.1096	20 24 51.3	5.556
14	8 48 42.76	2.1080	20 19 15.0	5.654
15	8 50 49.19	2.1063	20 13 32.8	5.751
16	8 52 55.52	2.1046	20 7 44.8	5.847
17	8 55 1.75	2.1029	20 1 51.1	5.943
18	8 57 7.87	2.1012	19 55 51.6	6.039
19	8 59 13.89	2.0995	19 49 46.4	6.134
20	9 1 19.81	2.0978	19 43 35.5	6.228
21	9 3 25.63	2.0961	19 37 19.0	6.323
22	9 5 31.34	2.0943	19 30 56.8	6.417
23	9 7 36.94	2.0925	19 24 29.0	6.510
24	9 9 42.44	2.0907	N.19 17 55.6	6.603

MONDAY, JULY 1.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	9 9 42.44	2.0907	N.19 17 55.6	6.603

PHASES OF THE MOON.

		d	h	m
☽ First Quarter	. June	6	8	1.5
○ Full Moon	. . . .	13	1	58.2
☾ Last Quarter	. . . .	19	19	35.0
● New Moon	. . . .	27	20	53.6

		d	h
☾ Perigee	. . . . June	13	4.0
☾ Apogee	. . . . . .	26	20.6

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Sun	W.	30° 7′ 21″	3454	31° 28′ 37″	3450	32° 49′ 57″	3446	34° 11′ 21″	3443
	Saturn	E.	34 9 50	3103	32 41 44	3101	31 13 36	3100	29 45 26	3098
	Regulus	E.	47 2 27	3081	45 33 54	3080	44 5 20	3079	42 36 45	3078
	Spica	E.	101 2 20	3102	99 34 13	3101	98 6 4	3099	96 37 53	3096
2	Sun	W.	40 59 32	3420	42 21 26	3415	43 43 26	3409	45 5 32	3403
	Regulus	E.	35 13 15	3068	33 44 26	3065	32 15 34	3062	30 46 38	3060
	Spica	E.	89 16 2	3078	87 47 26	3075	86 18 46	3070	84 50 0	3066
3	Sun	W.	51 57 49	3369	53 20 41	3362	54 43 41	3354	56 6 50	3345
	Spica	E.	77 24 41	3039	75 55 16	3032	74 25 43	3026	72 56 2	3019
	Antares	E.	123 17 36	3055	121 48 31	3046	120 19 15	3038	118 49 49	3029
4	Sun	W.	63 5 10	3298	64 29 24	3287	65 53 51	3276	67 18 30	3265
	Pollux	W.	25 32 4	3055	27 1 9	3033	28 30 41	3014	30 0 37	2994
	Spica	E.	65 25 24	2981	63 54 47	2972	62 23 59	2963	60 53 0	2954
	Antares	E.	111 19 47	2981	109 49 10	2970	108 18 20	2959	106 47 16	2949
5	Sun	W.	74 25 19	3202	75 51 26	3188	77 17 50	3173	78 44 31	3159
	Pollux	W.	37 35 55	2909	39 8 2	2893	40 40 30	2876	42 13 19	2860
	Spica	E.	53 15 10	2905	51 42 58	2896	50 10 34	2886	48 37 57	2875
	Antares	E.	99 8 22	2889	97 35 49	2876	96 2 59	2862	94 29 52	2849
6	Sun	W.	86 2 24	3082	87 30 56	3065	88 59 49	3048	90 29 2	3030
	Pollux	W.	50 2 41	2778	51 37 38	2761	53 12 57	2744	54 48 39	2727
	Saturn	W.	26 19 34	2779	27 54 30	2763	29 29 47	2747	31 5 25	2730
	Spica	E.	40 51 32	2825	39 17 36	2815	37 43 28	2807	36 9 9	2799
	Antares	E.	86 39 51	2778	85 4 54	2763	83 29 38	2747	81 54 1	2732
	Jupiter	E.	113 36 6	2702	111 59 29	2687	110 22 32	2672	108 45 15	2657
7	Sun	W.	98 0 37	2941	99 32 4	2922	101 3 55	2903	102 36 10	2883
	Pollux	W.	62 52 54	2638	64 30 57	2621	66 9 24	2602	67 48 16	2584
	Saturn	W.	39 9 13	2644	40 47 8	2626	42 25 28	2608	44 4 12	2590
	Regulus	W.	26 58 15	2644	28 36 10	2624	30 14 33	2603	31 53 24	2583
	Antares	E.	73 50 42	2652	72 12 57	2635	70 34 49	2618	68 56 18	2601
	Jupiter	E.	100 33 21	2573	98 53 49	2556	97 13 53	2539	95 33 34	2522
8	Sun	W.	110 23 37	2787	111 58 22	2766	113 33 34	2747	115 9 12	2727
	Pollux	W.	76 8 57	2491	77 50 23	2472	79 32 15	2454	81 14 33	2435
	Saturn	W.	52 24 6	2499	54 5 21	2480	55 47 3	2461	57 29 11	2443
	Regulus	W.	40 14 29	2485	41 56 4	2465	43 38 6	2445	45 20 36	2426
	Antares	E.	60 38 2	2517	58 57 13	2501	57 16 1	2485	55 34 26	2469
	Jupiter	E.	87 5 45	2431	85 22 54	2413	83 39 38	2395	81 55 56	2376
	α Aquilæ	E.	106 13 21	3187	104 46 56	3158	103 19 57	3130	101 52 24	3103
9	Sun	W.	123 13 55	2629	124 52 11	2610	126 30 52	2591	128 9 59	2572
	Pollux	W.	89 52 41	2343	91 37 38	2325	93 23 1	2308	95 8 49	2291
	Saturn	W.	66 6 25	2351	67 51 10	2333	69 36 22	2314	71 22 1	2296
	Regulus	W.	53 59 54	2332	55 45 7	2313	57 30 47	2295	59 16 54	2277
	Antares	E.	47 0 58	2393	45 17 13	2380	43 33 9	2366	41 48 46	2355
	Jupiter	E.	73 10 46	2285	71 24 25	2268	69 37 38	2250	67 50 25	2232
	α Aquilæ	E.	94 26 47	2984	92 56 14	2964	91 25 16	2946	89 53 55	2928

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Sun	W.	35° 32′ 49″	3438	36° 54′ 22″	3434	38° 16′ 0″	3430	39° 37′ 43″	3424
	Saturn	E.	28 17 14	3096	26 49 0	3094	25 20 43	3092	23 52 24	3091
	Regulus	E.	41 8 8	3075	39 39 28	3073	38 10 46	3072	36 42 2	3069
	Spica	E.	95 9 39	3093	93 41 21	3090	92 12 59	3087	90 44 33	3082
2	Sun	W.	46 27 45	3397	47 50 5	3391	49 12 32	3385	50 35 6	3377
	Regulus	E.	29 17 39	3058	27 48 38	3056	26 19 34	3054	24 50 28	3052
	Spica	E.	83 21 9	3061	81 52 12	3056	80 23 8	3051	78 53 58	3045
3	Sun	W.	57 30 9	3337	58 53 38	3327	60 17 18	3319	61 41 8	3308
	Spica	E.	71 26 13	3012	69 56 15	3005	68 26 8	2997	66 55 51	2989
	Antares	E.	117 20 12	3019	115 50 23	3010	114 20 23	3001	112 50 11	2991
4	Sun	W.	68 43 23	3253	70 8 30	3241	71 33 51	3228	72 59 27	3214
	Pollux	W.	31 30 57	2976	33 1 40	2959	34 32 44	2942	36 4 9	2926
	Spica	E.	59 21 50	2946	57 50 29	2935	56 18 55	2926	54 47 9	2916
	Antares	E.	105 15 59	2937	103 44 27	2926	102 12 41	2913	100 40 39	2901
5	Sun	W.	80 11 29	3144	81 38 45	3129	83 6 19	3114	84 34 12	3098
	Pollux	W.	43 46 29	2844	45 20 0	2828	46 53 52	2811	48 28 6	2795
	Spica	E.	47 5 6	2865	45 32 2	2855	43 58 45	2845	42 25 15	2835
	Antares	E.	92 56 28	2835	91 22 46	2821	89 48 46	2808	88 14 28	2793
6	Sun	W.	91 58 37	3014	93 28 33	2995	94 58 52	2977	96 29 33	2959
	Pollux	W.	56 24 43	2710	58 1 10	2692	59 38 1	2675	61 15 15	2656
	Saturn	W.	32 41 25	2713	34 17 48	2695	35 54 34	2679	37 31 42	2662
	Spica	E.	34 34 40	2792	33 0 1	2785	31 25 14	2781	29 50 21	2779
	Antares	E.	80 18 4	2716	78 41 46	2700	77 5 6	2684	75 28 5	2668
	Jupiter	E.	107 7 37	2640	105 29 37	2624	103 51 14	2607	102 12 29	2591
7	Sun	W.	104 8 50	2864	105 41 55	2845	107 15 24	2826	108 49 18	2807
	Pollux	W.	69 27 33	2566	71 7 15	2547	72 47 23	2528	74 27 57	2510
	Saturn	W.	45 43 21	2572	47 22 55	2554	49 2 53	2535	50 43 17	2517
	Regulus	W.	33 32 42	2563	35 12 28	2543	36 52 41	2524	38 33 21	2504
	Antares	E.	67 17 25	2585	65 38 9	2568	63 58 30	2551	62 18 28	2534
	Jupiter	E.	93 52 51	2504	92 11 43	2485	90 30 9	2467	88 48 10	2449
8	Sun	W.	116 45 16	2707	118 21 46	2688	119 58 42	2668	121 36 5	2648
	Pollux	W.	82 57 18	2417	84 40 29	2398	86 24 7	2380	88 8 11	2362
	Saturn	W.	59 11 45	2424	60 54 46	2405	62 38 13	2387	64 22 6	2369
	Regulus	W.	47 3 33	2408	48 46 57	2388	50 30 49	2369	52 15 8	2350
	Antares	E.	53 52 29	2453	52 10 9	2437	50 27 27	2422	48 44 23	2407
	Jupiter	E.	80 11 47	2357	78 27 11	2339	76 42 9	2322	74 56 41	2303
	α Aquilæ	E.	100 24 18	3077	98 55 40	3052	97 26 31	3028	95 56 53	3005
9	Sun	W.	129 49 32	2553	131 29 31	2535	133 9 55	2517	134 50 44	2500
	Pollux	W.	96 55 2	2273	98 41 41	2256	100 28 45	2239	102 16 14	2223
	Saturn	W.	73 8 6	2279	74 54 36	2262	76 41 31	2245	78 28 51	2229
	Regulus	W.	61 3 27	2260	62 50 26	2242	64 37 51	2225	66 25 41	2208
	Antares	E.	40 4 7	2344	38 19 12	2335	36 34 4	2327	34 48 44	2321
	Jupiter	E.	66 2 45	2214	64 14 39	2198	62 26 8	2181	60 37 12	2165
	α Aquilæ	E.	88 22 12	2912	86 50 8	2897	85 17 45	2883	83 45 5	2872

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
10	Saturn	W.	80° 16′ 36″	2212	82° 4′ 45″	2196	83° 53′ 18″	2180	85° 42′ 15″	2165
	Regulus	W.	68 13 57	2192	70 2 37	2176	71 51 41	2160	73 41 9	2145
	Antares	E.	33 3 15	2317	31 17 41	2316	29 32 5	2319	27 46 33	2325
	Jupiter	E.	58 47 51	2149	56 58 6	2133	55 7 57	2117	53 17 24	2103
	α Aquilæ	E.	82 12 10	2862	80 39 2	2852	79 5 42	2845	77 32 13	2841
11	Regulus	W.	82 53 58	2077	84 45 33	2064	86 37 27	2053	88 29 39	2042
	Spica	W.	29 31 42	2208	31 19 58	2182	33 8 53	2158	34 58 24	2137
	Jupiter	E.	43 59 11	2035	42 6 31	2023	40 13 33	2012	38 20 17	2001
	α Aquilæ	E.	69 44 5	2848	68 10 39	2856	66 37 24	2867	65 4 23	2882
	Fomalhaut	E.	101 49 10	2272	100 2 29	2258	98 15 28	2245	96 28 7	2233
12	Regulus	W.	97 54 24	1999	99 48 0	1993	101 41 46	1987	103 35 40	1983
	Spica	W.	44 12 53	2061	46 4 52	2050	47 57 8	2041	49 49 39	2033
	α Aquilæ	E.	57 25 38	3015	55 55 44	3056	54 26 41	3103	52 58 35	3156
	Fomalhaut	E.	87 27 21	2188	85 38 35	2182	83 49 41	2178	82 0 40	2175
	α Pegasi	E.	103 43 0	2419	101 59 53	2407	100 16 28	2396	98 32 47	2387
13	Spica	W.	59 14 51	2007	61 8 14	2005	63 1 40	2004	64 55 8	2005
	α Aquilæ	E.	45 57 2	3554	44 37 37	3667	43 20 15	3797	42 5 10	3943
	Fomalhaut	E.	72 55 2	2178	71 6 1	2182	69 17 7	2189	67 28 23	2196
	α Pegasi	E.	89 51 53	2365	88 7 28	2366	86 23 4	2368	84 38 44	2373
14	Spica	W.	74 21 54	2018	76 15 0	2024	78 7 57	2030	80 0 45	2037
	Antares	W.	28 49 59	2136	30 40 3	2126	32 30 23	2119	34 20 53	2115
	Fomalhaut	E.	58 28 23	2260	56 41 25	2279	54 54 54	2299	53 8 53	2322
	α Pegasi	E.	75 59 17	2417	74 16 7	2431	72 33 17	2448	70 50 50	2465
	α Arietis	E.	118 53 15	2171	117 4 4	2170	115 14 51	2170	113 25 39	2173
15	Antares	W.	43 33 49	2126	45 24 9	2132	47 14 19	2140	49 4 17	2149
	Jupiter	W.	17 9 9	2015	19 2 20	2026	20 55 13	2039	22 47 47	2051
	Fomalhaut	E.	44 28 29	2481	42 46 49	2525	41 6 10	2572	39 26 37	2626
	α Pegasi	E.	62 25 53	2588	60 46 41	2619	59 8 12	2654	57 30 30	2691
	α Arietis	E.	104 21 16	2204	102 32 55	2213	100 44 47	2223	98 56 54	2235
	Venus	E.	110 5 7	2250	108 17 54	2263	106 31 0	2276	104 44 25	2289
16	Antares	W.	58 10 16	2206	59 58 34	2220	61 46 31	2235	63 34 7	2249
	Jupiter	W.	32 5 38	2120	33 56 7	2135	35 46 13	2151	37 35 55	2167
	α Pegasi	E.	49 35 48	2931	48 4 8	2992	46 33 45	3059	45 4 45	3132
	α Arietis	E.	90 2 1	2302	88 16 4	2318	86 30 31	2335	84 45 22	2351
	Venus	E.	95 56 49	2367	94 12 27	2384	92 28 29	2401	90 44 55	2418
	Sun	E.	138 57 26	2453	137 15 6	2469	135 33 9	2485	133 51 35	2502
17	Antares	W.	72 26 30	2328	74 11 48	2346	75 56 41	2364	77 41 8	2381
	Jupiter	W.	46 38 16	2251	48 25 27	2268	50 12 13	2285	51 58 34	2303
	α Arietis	E.	76 5 59	2445	74 23 28	2465	72 41 26	2487	70 59 54	2508
	Venus	E.	82 13 29	2511	80 32 31	2530	78 52 0	2549	77 11 55	2569
	Sun	E.	125 29 51	2592	123 50 45	2611	122 12 5	2631	120 33 52	2650
18	Antares	W.	86 17 7	2470	87 59 3	2487	89 40 34	2506	91 21 39	2525
	Jupiter	W.	60 43 46	2393	62 27 31	2411	64 10 50	2429	65 53 43	2447
	α Aquilæ	W.	47 9 28	3846	48 23 43	3791	49 38 55	3742	50 54 58	3699

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XV$^{\text{h}}$.	P. L. of Diff.	XVIII$^{\text{h}}$.	P. L. of Diff.	XXI$^{\text{h}}$.	P. L. of Diff.
10	Saturn	W.	87° 31′ 35″	2151	89° 21′ 17″	2137	91° 11′ 20″	2124	93° 1′ 43″	2111
	Regulus	W.	75 30 59	2130	77 21 12	2116	79 11 47	2102	81 2 43	2090
	Antares	E.	26 1 10	2337	24 16 4	2355	22 31 25	2383	20 47 26	2424
	Jupiter	E.	51 26 29	2088	49 35 12	2074	47 43 33	2060	45 51 32	2047
	α Aquilæ	E.	75 58 38	2838	74 24 59	2836	72 51 18	2838	71 17 39	2842
11	Regulus	W.	90 22 7	2032	92 14 51	2023	94 7 49	2015	96 1 0	2007
	Spica	W.	36 48 27	2118	38 38 58	2102	40 29 54	2087	42 21 13	2073
	Jupiter	E.	36 26 45	1991	34 32 57	1982	32 38 54	1974	30 44 38	1965
	α Aquilæ	E.	63 31 41	2901	61 59 23	2923	60 27 33	2949	58 56 16	2980
	Fomalhaut	E.	94 40 28	2231	92 52 32	2211	91 4 21	2202	89 15 57	2194
12	Regulus	W.	105 29 41	1979	107 23 49	1975	109 18 3	1972	111 12 21	1971
	Spica	W.	51 42 22	2026	53 35 16	2019	55 28 20	2014	57 21 32	2010
	α Aquilæ	E.	51 31 33	3216	50 5 43	3286	48 41 15	3365	47 18 18	3454
	Fomalhaut	E.	80 11 35	2173	78 22 27	2172	76 33 17	2172	74 44 8	2174
	α Pegasi	E.	96 48 53	2379	95 4 48	2373	93 20 35	2369	91 36 16	2366
13	Spica	W.	66 48 35	2005	68 42 1	2008	70 35 23	2010	72 28 41	2014
	α Aquilæ	E.	40 52 34	4110	39 42 42	4301	38 35 50	4518	37 32 14	4769
	Fomalhaut	E.	65 39 50	2206	63 51 31	2217	62 3 29	2229	60 15 45	2244
	α Pegasi	E.	82 54 30	2378	81 10 24	2385	79 26 28	2394	77 42 45	2405
14	Spica	W.	81 53 21	2045	83 45 45	2053	85 37 56	2063	87 29 52	2073
	Antares	W.	36 11 29	2114	38 2 7	2114	39 52 45	2116	41 43 20	2120
	Fomalhaut	E.	51 23 26	2348	49 38 36	2376	47 54 27	2408	46 11 3	2443
	α Pegasi	E.	69 8 48	2486	67 27 15	2508	65 46 13	2533	64 5 45	2559
	α Arietis	E.	111 36 31	2177	109 47 29	2182	107 58 35	2188	106 9 50	2196
15	Antares	W.	50 54 1	2159	52 43 30	2170	54 32 43	2181	56 21 39	2194
	Jupiter	W.	24 40 2	2064	26 31 57	2077	28 23 32	2090	30 14 46	2105
	Fomalhaut	E.	37 48 17	2687	36 11 19	2754	34 35 51	2831	33 2 4	2920
	α Pegasi	E.	55 53 38	2732	54 17 40	2775	52 42 39	2822	51 8 40	2874
	α Arietis	E.	97 9 18	2247	95 22 0	2259	93 35 0	2272	91 48 20	2287
	Venus	E.	102 58 10	2304	101 12 16	2319	99 26 44	2335	97 41 35	2350
16	Antares	W.	65 21 22	2264	67 8 14	2280	68 54 43	2296	70 40 48	2312
	Jupiter	W.	39 25 13	2182	41 14 7	2199	43 2 36	2216	44 50 39	2234
	α Pegasi	E.	43 37 14	3213	42 11 20	3301	40 47 10	3399	39 24 52	3507
	α Arietis	E.	83 0 37	2368	81 16 17	2387	79 32 24	2406	77 48 58	2425
	Venus	E.	89 1 46	2436	87 19 2	2454	85 36 44	2473	83 54 53	2492
	Sun	E.	132 10 25	2520	130 29 39	2538	128 49 18	2556	127 9 22	2574
17	Antares	W.	79 25 10	2398	81 8 47	2416	82 51 59	2433	84 34 46	2452
	Jupiter	W.	53 44 29	2322	55 29 57	2339	57 14 59	2357	58 59 35	2375
	α Arietis	E.	69 18 52	2530	67 38 20	2552	65 58 19	2574	64 18 49	2599
	Venus	E.	75 32 17	2588	73 53 6	2608	72 14 22	2628	70 36 5	2648
	Sun	E.	118 56 5	2669	117 18 43	2688	115 41 47	2707	114 5 17	2726
18	Antares	W.	93 2 18	2543	94 42 32	2560	96 22 22	2578	98 1 47	2596
	Jupiter	W.	67 36 11	2465	69 18 14	2482	70 59 53	2499	72 41 7	2517
	α Aquilæ	W.	52 11 46	3663	53 29 13	3630	54 47 15	3602	56 5 47	3579

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	III^h.	P. L. of Diff.	VI^h.	P. L. of Diff.	IX^h.	P. L. of Diff.
18	α Arietis	E.	62° 39′ 52″	2623	61° 1′ 28″	2647	59° 23′ 37″	2672	57° 46′ 19″	2698
	Venus	E.	68 58 15	2668	67 20 52	2687	65 43 55	2707	64 7 24	2727
	Sun	E.	112 29 12	2746	110 53 33	2766	109 18 20	2785	107 43 33	2805
19	Antares	W.	99 40 48	2614	101 19 24	2632	102 57 36	2649	104 35 25	2666
	Jupiter	W.	74 21 56	2535	76 2 21	2551	77 42 23	2568	79 22 2	2585
	α Aquilæ	W.	57 24 44	3559	58 44 3	3542	60 3 41	3527	61 23 35	3516
	α Arietis	E.	49 48 45	2838	48 15 7	2869	46 42 9	2902	45 9 53	2936
	Venus	E.	56 11 20	2823	54 37 22	2842	53 3 49	2862	51 30 41	2880
	Sun	E.	99 55 49	2899	98 23 29	2918	96 51 33	2936	95 20 0	2954
20	Jupiter	W.	87 34 41	2664	89 12 9	2680	90 49 16	2694	92 26 4	2709
	α Aquilæ	W.	68 5 30	3487	69 26 9	3486	70 46 49	3487	72 7 28	3488
	Fomalhaut	W.	32 28 27	3442	33 49 56	3397	35 12 16	3360	36 35 18	3330
	Venus	E.	43 50 47	2969	42 19 55	2985	40 49 24	3001	39 19 13	3018
	Sun	E.	87 47 47	3041	86 18 25	3057	84 49 23	3073	83 20 40	3089
21	Jupiter	W.	100 25 22	2776	102 0 21	2789	103 35 3	2801	105 9 29	2813
	α Aquilæ	W.	78 50 1	3507	80 10 17	3514	81 30 26	3520	82 50 28	3528
	Fomalhaut	W.	43 37 33	3239	45 2 56	3230	46 28 30	3222	47 54 13	3216
	α Pegasi	W.	33 2 39	4585	34 5 17	4457	35 9 47	4346	36 15 57	4249
	Venus	E.	31 53 15	3095	30 24 59	3110	28 57 1	3124	27 29 20	3137
	Sun	E.	76 1 48	3163	74 34 54	3177	73 8 17	3190	71 41 56	3203
22	α Aquilæ	W.	89 28 22	3573	90 47 26	3583	92 6 19	3594	93 25 0	3605
	Fomalhaut	W.	55 4 6	3203	56 30 12	3203	57 56 18	3203	59 22 24	3204
	α Pegasi	W.	42 6 20	3914	43 19 26	3867	44 33 19	3827	45 47 53	3791
	Sun	E.	64 33 51	3262	63 8 55	3272	61 44 11	3283	60 19 40	3294
23	α Aquilæ	W.	99 55 11	3670	101 12 30	3684	102 29 34	3698	103 46 23	3713
	Fomalhaut	W.	66 32 32	3212	67 58 27	3214	69 24 20	3216	70 50 10	3220
	α Pegasi	W.	52 9 0	3659	53 26 31	3640	54 44 22	3623	56 2 32	3608
	Sun	E.	53 19 49	3338	51 56 21	3345	50 33 2	3352	49 9 51	3358
24	Fomalhaut	W.	77 58 31	3232	79 24 2	3235	80 49 30	3237	82 14 55	3240
	α Pegasi	W.	62 37 1	3550	63 56 30	3541	65 16 9	3534	66 35 56	3527
	α Arietis	W.	20 26 49	4572	21 29 38	4383	22 35 15	4227	23 43 16	4097
	Sun	E.	42 15 48	3390	40 53 20	3394	39 30 57	3400	38 8 40	3404
25	Fomalhaut	W.	89 21 12	3253	90 46 18	3256	92 11 21	3259	93 36 21	3262
	α Pegasi	W.	73 16 31	3501	74 36 54	3497	75 57 22	3494	77 17 53	3491
	α Arietis	W.	29 49 14	3693	31 6 8	3644	32 23 55	3600	33 42 29	3562
	Sun	E.	31 18 23	3422	29 56 31	3424	28 34 42	3427	27 12 56	3430
29	Sun	W.	12 18 29	3402	13 40 43	3398	15 3 2	3393	16 25 26	3388
	Saturn	E.	27 52 2	3091	26 23 41	3089	24 55 18	3087	23 26 52	3085
	Regulus	E.	38 8 7	3059	36 39 7	3057	35 10 5	3055	33 41 0	3053
	Spica	E.	92 10 23	3073	90 41 41	3070	89 12 55	3066	87 44 4	3063
30	Sun	W.	23 18 48	3364	24 41 46	3358	26 4 50	3352	27 28 1	3347
	Regulus	E.	26 15 4	3047	24 45 49	3046	23 16 33	3047	21 47 18	3048
	Spica	E.	80 18 37	3041	78 49 15	3037	77 19 48	3033	75 50 16	3028

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P.L. of Diff.	XVh.	P.L. of Diff.	XVIIIh.	P.L. of Diff.	XXIh.	P.L. of Diff.
18	α Arietis	E.	56° 9′ 36″	2795	54° 33′ 29″	2751	52° 57′ 57″	2779	51° 23′ 2″	2808
	Venus	E.	62 31 20	2747	60 55 42	2766	59 20 29	2785	57 45 42	2805
	Sun	E.	106 9 11	2824	104 35 14	2842	103 1 41	2862	101 28 33	2880
19	Antares	W.	106 12 51	2684	107 49 53	2701	109 26 32	2717	111 2 49	2735
	Jupiter	W.	81 1 18	2601	82 40 11	2618	84 18 42	2633	85 56 52	2649
	α Aquilæ	W.	62 43 41	3506	64 3 58	3499	65 24 23	3494	66 44 54	3489
	α Arietis	E.	43 38 20	2972	42 7 32	3009	40 37 31	3050	39 8 20	3092
	Venus	E.	49 57 57	2898	48 25 36	2916	46 53 37	2934	45 22 1	2951
	Sun	E.	93 48 49	2972	92 18 1	2989	90 47 35	3006	89 17 30	3024
20	Jupiter	W.	94 2 32	2723	95 38 41	2737	97 14 32	2750	98 50 6	2763
	α Aquilæ	W.	73 28 5	3490	74 48 40	3493	76 9 12	3497	77 29 39	3502
	Fomalhaut	W.	37 58 55	3305	39 23 1	3283	40 47 32	3265	42 12 24	3251
	Venus	E.	37 49 23	3034	36 19 53	3050	34 50 42	3065	33 21 49	3080
	Sun	E.	81 52 17	3105	80 24 13	3119	78 56 27	3134	77 28 59	3148
21	Jupiter	W.	106 43 40	2825	108 17 36	2835	109 51 18	2846	111 24 46	2858
	α Aquilæ	W.	84 10 21	3536	85 30 5	3545	86 49 40	3553	88 9 6	3562
	Fomalhaut	W.	49 20 3	3212	50 45 58	3208	52 11 58	3205	53 38 1	3204
	α Pegasi	W.	37 23 37	4164	38 32 37	4089	39 42 49	4023	40 54 6	3965
	Venus	E.	26 1 55	3150	24 34 46	3163	23 7 53	3176	21 41 15	3188
	Sun	E.	70 15 50	3215	68 49 59	3228	67 24 23	3239	65 59 0	3251
22	α Aquilæ	W.	94 43 29	3617	96 1 45	3629	97 19 48	3642	98 37 37	3656
	Fomalhaut	W.	60 48 29	3204	62 14 33	3206	63 40 35	3208	65 6 35	3210
	α Pegasi	W.	47 3 5	3758	48 18 51	3729	49 35 7	3703	50 51 51	3679
	Sun	E.	58 55 21	3303	57 31 13	3312	56 7 15	3320	54 43 27	3329
23	α Aquilæ	W.	105 2 56	3730	106 19 11	3747	107 35 8	3766	108 50 46	3785
	Fomalhaut	W.	72 15 56	3221	73 41 40	3225	75 7 20	3227	76 32 57	3230
	α Pegasi	W.	57 20 58	3594	58 39 39	3581	59 58 34	3569	61 17 42	3559
	Sun	E.	47 46 47	3365	46 23 51	3372	45 1 3	3379	43 38 22	3385
24	Fomalhaut	W.	83 40 17	3242	85 5 36	3246	86 30 51	3248	87 56 3	3251
	α Pegasi	W.	67 55 50	3521	69 15 51	3515	70 35 59	3510	71 56 12	3505
	α Arietis	W.	24 53 21	3987	26 5 13	3896	27 18 37	3818	28 33 21	3751
	Sun	E.	36 46 28	3408	35 24 20	3412	34 2 17	3415	32 40 18	3419
25	Fomalhaut	W.	95 1 17	3265	96 26 10	3267	97 51 0	3270	99 15 47	3271
	α Pegasi	W.	78 38 27	3488	79 59 4	3486	81 19 44	3484	82 40 26	3483
	α Arietis	W.	35 1 45	3528	36 21 38	3499	37 42 3	3472	39 2 58	3448
	Sun	E.	25 51 13	3431	24 29 32	3433	23 7 53	3435	21 46 16	3436
29	Sun	W.	17 47 56	3384	19 10 31	3379	20 33 11	3374	21 55 57	3370
	Saturn	E.	21 58 24	3083	20 29 54	3082	19 1 22	3081	17 32 49	3082
	Regulus	E.	32 11 53	3051	30 42 43	3049	29 13 31	3048	27 44 18	3047
	Spica	E.	86 15 9	3059	84 46 9	3055	83 17 4	3050	81 47 53	3046
30	Sun	W.	28 51 18	3341	30 14 42	3334	31 38 14	3327	33 1 54	3321
	Regulus	E.	20 18 5	3052	18 48 56	3058	17 19 55	3067	15 51 5	3079
	Spica	E.	74 20 38	3029	72 50 53	3018	71 21 2	3012	69 51 4	3006

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.	Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Mon.	1	6 42 31.87	10.340	N.23 5 34.1	−10.50	15 46.13	68.77	3 36.29	0.483
Tues.	2	6 46 39.89	10.328	23 1 10.0	11.51	15 46.13	68.73	3 47.72	0.470
Wed.	3	6 50 47.60	10.315	22 56 21.8	12.51	15 46.14	68.69	3 58.84	0.457
Thur.	4	6 54 55.00	10.301	22 51 9.4	−13.50	15 46.15	68.65	4 9.65	0.444
Frid.	5	6 59 2.06	10.286	22 45 33.3	14.49	15 46.16	68.60	4 20.13	0.429
Sat.	6	7 3 8.75	10.270	22 39 33.5	15.48	15 46.18	68.55	4 30.23	0.413
SUN.	7	7 7 15.06	10.254	22 33 10.1	−16.46	15 46.20	68.50	4 39.95	0.397
Mon.	8	7 11 20.97	10.237	22 26 23.2	17.43	15 46.23	68.45	4 49.27	0.380
Tues.	9	7 15 26.46	10.220	22 19 13.1	18.40	15 46.26	68.39	4 58.18	0.363
Wed.	10	7 19 31.51	10.202	22 11 40.0	−19.35	15 46.29	68.33	5 6.66	0.345
Thur.	11	7 23 36.12	10.183	22 3 44.0	20.30	15 46.33	68.27	5 14.69	0.326
Frid.	12	7 27 40.28	10.164	21 55 25.2	21.24	15 46.37	68.21	5 22.27	0.307
Sat.	13	7 31 43.97	10.144	21 46 43.9	−22.18	15 46.42	68.14	5 29.39	0.287
SUN.	14	7 35 47.18	10.124	21 37 40.4	23.10	15 46.47	68.07	5 36.03	0.267
Mon.	15	7 39 49.91	10.104	21 28 14.7	24.02	15 46.52	68.00	5 42.18	0.247
Tues.	16	7 43 52.15	10.083	21 18 27.1	−24.93	15 46.57	67.93	5 47.83	0.226
Wed.	17	7 47 53.88	10.062	21 8 17.7	25.83	15 46.63	67.85	5 52.99	0.205
Thur.	18	7 51 55.09	10.040	20 57 46.9	26.72	15 46.69	67.78	5 57.64	0.183
Frid.	19	7 55 55.78	10.017	20 46 54.8	−27.60	15 46.76	67.70	6 1.76	0.161
Sat.	20	7 59 55.94	9.995	20 35 41.7	28.47	15 46.83	67.62	6 5.35	0.139
SUN.	21	8 3 55.56	9.972	20 24 7.8	29.34	15 46.91	67.54	6 8.41	0.116
Mon.	22	8 7 54.65	9.949	20 12 13.3	−30.19	15 46.99	67.46	6 10.93	0.093
Tues.	23	8 11 53.17	9.926	19 59 58.5	31.04	15 47.07	67.38	6 12.90	0.070
Wed.	24	8 15 51.11	9.903	19 47 23.6	31.87	15 47.16	67.30	6 14.29	0.047
Thur.	25	8 19 48.48	9.879	19 34 28.8	−32.69	15 47.26	67.21	6 15.10	0.023
Frid.	26	8 23 45.27	9.855	19 21 14.6	33.49	15 47.36	67.13	6 15.33	0.001
Sat.	27	8 27 41.46	9.830	19 7 41.1	34.29	15 47.46	67.04	6 14.96	0.026
SUN.	28	8 31 37.06	9.805	18 53 48.6	−35.08	15 47.57	66.96	6 14.01	0.051
Mon.	29	8 35 32.06	9.779	18 39 37.4	35.85	15 47.69	66.87	6 12.46	0.077
Tues.	30	8 39 26.44	9.754	18 25 7.8	36.61	15 47.81	66.78	6 10.29	0.102
Wed.	31	8 43 20.20	9.728	18 10 20.1	37.36	15 47.93	66.69	6 7.50	0.128
Thur.	32	8 47 13.34	9.702	N.17 55 14.5	−38.09	15 48.06	66.60	6 4.09	0.154

NOTE.—The mean time of semidiameter passing may be found by subtracting $0^s.19$ from the sidereal time.

The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	THE SUN'S Diff. for 1 Hour.	THE SUN'S Apparent Declination.	THE SUN'S Diff. for 1 Hour.	Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ′ ″	″	m s	s	h m s
Mon.	1	6 42 31.25	10.339	N. 23 5 34.7	−10.50	3 36.26	0.483	6 38 54.99
Tues.	2	6 46 39.24	10.327	23 1 10.7	11.51	3 47.69	0.470	6 42 51.55
Wed.	3	6 50 46.92	10.314	22 56 22.6	12.51	3 58.81	0.457	6 46 48.11
Thur.	4	6 54 54.29	10.300	22 51 10.4	−13.50	4 9.62	0.444	6 50 44.67
Frid.	5	6 59 1.32	10.285	22 45 34.4	14.49	4 20.10	0.429	6 54 41.22
Sat.	6	7 3 7.98	10.269	22 39 34.7	15.48	4 30.20	0.413	6 58 37.78
SUN.	7	7 7 14.26	10.253	22 33 11.4	−16.46	4 39.92	0.397	7 2 34.34
Mon.	8	7 11 20.14	10.236	22 26 24.7	17.43	4 49.24	0.380	7 6 30.90
Tues.	9	7 15 25.60	10.219	22 19 14.8	18.40	4 58.15	0.363	7 10 27.45
Wed.	10	7 19 30.64	10.201	22 11 41.7	−19.35	5 6.63	0.345	7 14 24.01
Thur.	11	7 23 35.23	10.182	22 3 45.8	20.30	5 14.66	0.326	7 18 20.57
Frid.	12	7 27 39.37	10.163	21 55 27.2	21.24	5 22.24	0.307	7 22 17.13
Sat.	13	7 31 43.04	10.143	21 46 46.0	−22.18	5 29.36	0.287	7 26 13.68
SUN.	14	7 35 46.24	10.123	21 37 42.6	23.10	5 36.00	0.267	7 30 10.24
Mon.	15	7 39 48.95	10.103	21 28 17.0	24.02	5 42.15	0.247	7 34 6.80
Tues.	16	7 43 51.17	10.082	21 18 29.5	−24.93	5 47.81	0.226	7 38 3.36
Wed.	17	7 47 52.89	10.061	21 8 20.3	25.83	5 52.97	0.205	7 41 59.92
Thur.	18	7 51 54.09	10.039	20 57 49.6	26.72	5 57.62	0.183	7 45 56.47
Frid.	19	7 55 54.77	10.017	20 46 57.6	−27.60	6 1.75	0.161	7 49 53.02
Sat.	20	7 59 54.92	9.995	20 35 44.6	28.47	6 5.34	0.139	7 53 49.58
SUN.	21	8 3 54.54	9.972	20 24 10.8	29.34	6 8.40	0.116	7 57 46.14
Mon.	22	8 7 53.62	9.949	20 12 16.4	−30.19	6 10.92	0.093	8 1 42.70
Tues.	23	8 11 52.14	9.926	20 0 1.7	31.04	6 12.89	0.070	8 5 39.25
Wed.	24	8 15 50.08	9.903	19 47 26.9	31.87	6 14.28	0.047	8 9 35.80
Thur.	25	8 19 47.45	9.879	19 34 32.3	−32.69	6 15.09	0.023	8 13 32.36
Frid.	26	8 23 44.24	9.855	19 21 18.1	33.49	6 15.32	0.001	8 17 28.92
Sat.	27	8 27 40.44	9.830	19 7 44.7	34.29	6 14.96	0.026	8 21 25.48
SUN.	28	8 31 36.05	9.805	18 53 52.3	−35.08	6 14.01	0.051	8 25 22.04
Mon.	29	8 35 31.05	9.779	18 39 41.2	35.85	6 12.46	0.077	8 29 18.59
Tues.	30	8 39 25.44	9.754	18 25 11.6	36.61	6 10.30	0.102	8 33 15.14
Wed.	31	8 43 19.21	9.728	18 10 23.9	37.36	6 7.51	0.128	8 37 11.70
Thur.	32	8 47 12.36	9.702	N. 17 55 18.4	−38.09	6 4.10	0.154	8 41 8.26

Note.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 hour,
$+9^{s}.8565$.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		λ	λ′					
		° ′ ″	′ ″	″	″			h m s
1	182	99 46 31.0	46 22.6	143.04	+ 0.09	0.0072299	+ 0.3	17 18 14.45
2	183	100 43 43.8	43 35.2	143.03	0.19	0.0072293	− 0.7	17 14 18.53
3	184	101 40 56.4	40 47.6	143.02	0.27	0.0072263	1.7	17 10 22.62
4	185	102 38 8.7	37 59.8	143.01	+ 0.31	0.0072210	− 2.7	17 6 26.71
5	186	103 35 20.9	35 11.8	143.00	0.32	0.0072136	3.6	17 2 30.80
6	187	104 32 32.9	32 23.6	143.00	0.30	0.0072041	4.4	16 58 34.89
7	188	105 29 44.7	29 35.3	142.99	+ 0.24	0.0071926	− 5.2	16 54 38.98
8	189	106 26 56.4	26 46.8	142.99	0.16	0.0071793	5.9	16 50 43.07
9	190	107 24 8.1	23 58.3	142.99	+ 0.07	0.0071643	6.6	16 46 47.16
10	191	108 21 19.9	21 9.9	142.99	− 0.05	0.0071477	− 7.2	16 42 51.24
11	192	109 18 31.7	18 21.5	142.99	0.18	0.0071296	7.8	16 38 55.33
12	193	110 15 43.6	15 33.2	143.00	0.32	0.0071101	8.4	16 34 59.42
13	194	111 12 55.8	12 45.2	143.02	− 0.46	0.0070891	− 9.0	16 31 3.51
14	195	112 10 8.4	9 57.6	143.04	0.58	0.0070668	9.6	16 27 7.60
15	196	113 7 21.5	7 10.6	143.06	0.68	0.0070431	10.2	16 23 11.69
16	197	114 4 35.2	4 24.1	143.08	− 0.76	0.0070178	−10.8	16 19 15.78
17	198	115 1 49.5	1 38.2	143.11	0.82	0.0069910	11.5	16 15 19.87
18	199	115 59 4.5	58 53.1	143.14	0.85	0.0069625	12.2	16 11 23.96
19	200	116 56 20.2	56 8.7	143.17	− 0.85	0.0069323	−13.0	16 7 28.05
20	201	117 53 36.7	53 25.0	143.20	0.82	0.0069003	13.8	16 3 32.14
21	202	118 50 54.1	50 42.2	143.24	0.76	0.0068664	14.6	15 59 36.23
22	203	119 48 12.4	48 0.3	143.27	− 0.68	0.0068303	−15.5	15 55 40.31
23	204	120 45 31.5	45 19.3	143.31	0.57	0.0067919	16.5	15 51 44.40
24	205	121 42 51.5	42 39.2	143.35	0.45	0.0067512	17.4	15 47 48.49
25	206	122 40 12.4	39 59.9	143.39	− 0.33	0.0067082	−18.4	15 43 52.58
26	207	123 37 34.1	37 21.5	143.42	0.19	0.0066628	19.4	15 39 56.67
27	208	124 34 56.7	34 43.9	143.46	− 0.06	0.0066149	20.5	15 36 0.76
28	209	125 32 20.1	32 7.2	143.49	+ 0.05	0.0065645	−21.6	15 32 4.85
29	210	126 29 44.3	29 31.3	143.52	0.15	0.0065116	22.6	15 28 8.94
30	211	127 27 9.2	26 56.0	143.55	0.23	0.0064562	23.6	15 24 13.03
31	212	128 24 34.8	24 21.4	143.58	0.28	0.0063985	24.5	15 20 17.12
32	213	129 22 1.0	21 47.6	143.61	+ 0.30	0.0063386	−25.4	15 16 21.21

NOTE.—The numbers in column λ correspond to the true equinox of the date; in column λ′, to the mean equinox of January $0^{d}.0$.

Diff. for 1 Hour,
— $9^{s}.8296$.
(Table II.)

GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	14 56.3	14 59.6	54 42.7	+0.94	54 54.7	+1.06	2 35.8	1.98	3.1
2	15 3.3	15 7.4	55 8.2	1.19	55 23.2	1.32	3 22.9	1.94	4.1
3	15 11.9	15 16.8	55 39.8	1.46	55 57.9	1.58	4 8.9	1.90	5.1
4	15 22.2	15 28.0	56 17.6	+1.71	56 38.8	+1.83	4 54.4	1.89	6.1
5	15 34.1	15 40.6	57 1.4	1.93	57 25.1	2.02	5 40.1	1.92	7.1
6	15 47.3	15 54.2	57 49.8	2.09	58 15.1	2.12	6 27.0	1.99	8.1
7	16 1.1	16 8.1	58 40.7	+2.13	59 6.1	+2.09	7 16.1	2.11	9.1
8	16 14.8	16 21.1	59 30.7	2.00	59 54.0	1.86	8 8.5	2.27	10.1
9	16 26.9	16 32.0	60 15.4	1.67	60 34.2	1.43	9 5.0	2.45	11.1
10	16 36.3	16 39.5	60 49.8	+1.14	61 1.6	+0.81	10 5.8	2.61	12.1
11	16 41.6	16 42.4	61 9.2	+0.44	61 12.2	+0.05	11 9.6	2.69	13.1
12	16 41.9	16 40.1	61 10.4	−0.35	61 3.9	−0.73	12 14.2	2.67	14.1
13	16 37.1	16 32.9	60 52.8	−1.11	60 37.4	−1.45	13 16.8	2.54	15.1
14	16 27.7	16 21.6	60 18.1	1.74	59 55.7	1.98	14 15.7	2.35	16.1
15	16 14.8	16 7.5	59 30.7	2.16	59 3.8	2.29	15 10.0	2.17	17.1
16	15 59.8	15 52.0	58 35.8	−2.36	58 7.2	−2.38	16 0.2	2.01	18.1
17	15 44.3	15 36.7	57 38.7	2.35	57 10.8	2.28	16 47.2	1.90	19.1
18	15 29.4	15 22.5	56 44.0	2.17	56 18.7	2.04	17 32.1	1.84	20.1
19	15 16.1	15 10.2	55 55.1	−1.88	55 33.6	−1.70	18 15.9	1.82	21.1
20	15 4.9	15 0.3	55 14.3	1.52	54 57.2	1.33	18 59.7	1.83	22.1
21	14 56.3	14 52.9	54 42.4	1.13	54 30.0	0.93	19 44.2	1.88	23.1
22	14 50.2	14 48.0	54 20.0	−0.74	54 12.2	−0.56	20 29.8	1.94	24.1
23	14 46.5	14 45.6	54 6.6	0.38	54 3.1	−0.21	21 17.0	2.00	25.1
24	14 45.1	14 45.2	54 1.5	−0.05	54 1.8	+0.10	22 5.4	2.04	26.1
25	14 45.8	14 46.7	54 3.8	+0.23	54 7.3	+0.36	22 54.7	2.06	27.1
26	14 48.1	14 49.8	54 12.3	0.48	54 18.7	0.59	23 44.1	2.05	28.1
27	14 51.9	14 54.2	54 26.3	0.68	54 35.0	0.77	δ		29.1
28	14 56.9	14 59.8	54 44.7	+0.85	54 55.4	+0.93	0 33.0	2.01	0.5
29	15 3.0	15 6.4	55 7.0	1.01	55 19.5	1.08	1 20.8	1.97	1.5
30	15 10.0	15 13.9	55 32.9	1.15	55 47.1	1.22	2 7.4	1.92	2.5
31	15 18.0	15 22.3	56 2.1	1.29	56 18.0	1.36	2 53.2	1.89	3.5
32	15 26.8	15 31.6	56 34.7	+1.43	56 52.2	+1.49	3 38.5	1.89	4.5

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

MONDAY 1.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	9 9 42.44	2.0907	N.19 17 55.6	6.603
1	9 11 47.83	2.0889	19 11 16.6	6.696
2	9 13 53.11	2.0872	19 4 32.1	6.787
3	9 15 58.29	2.0854	18 57 42.2	6.878
4	9 18 3.36	2.0836	18 50 46.8	6.968
5	9 20 8.32	2.0817	18 43 46.0	7.058
6	9 22 13.17	2.0799	18 36 39.8	7.148
7	9 24 17.91	2.0781	18 29 28.2	7.237
8	9 26 22.54	2.0764	18 22 11.3	7.326
9	9 28 27.07	2.0746	18 14 49.1	7.414
10	9 30 31.49	2.0727	18 7 21.6	7.501
11	9 32 35.79	2.0708	17 59 48.9	7.588
12	9 34 39.98	2.0689	17 52 11.0	7.675
13	9 36 44.06	2.0671	17 44 27.9	7.761
14	9 38 48.04	2.0654	17 36 39.7	7.846
15	9 40 51.91	2.0636	17 28 46.4	7.931
16	9 42 55.67	2.0618	17 20 48.0	8.015
17	9 44 59.32	2.0600	17 12 44.6	8.098
18	9 47 2.87	2.0582	17 4 36.2	8.181
19	9 49 6.31	2.0564	16 56 22.9	8.264
20	9 51 9.64	2.0546	16 48 4.6	8.346
21	9 53 12.86	2.0529	16 39 41.4	8.427
22	9 55 15.98	2.0512	16 31 13.4	8.508
23	9 57 19.00	2.0495	N.16 22 40.5	8.588

TUESDAY 2.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	9 59 21.92	2.0478	N.16 14 2.8	8.667
1	10 1 24.74	2.0461	16 5 20.4	8.746
2	10 3 27.45	2.0444	15 56 33.3	8.824
3	10 5 30.06	2.0427	15 47 41.5	8.902
4	10 7 32.57	2.0410	15 38 45.0	8.979
5	10 9 34.98	2.0394	15 29 44.0	9.055
6	10 11 37.30	2.0378	15 20 38.4	9.131
7	10 13 39.52	2.0362	15 11 28.3	9.206
8	10 15 41.65	2.0347	15 2 13.7	9.281
9	10 17 43.68	2.0331	14 52 54.6	9.355
10	10 19 45.62	2.0316	14 43 31.1	9.428
11	10 21 47.47	2.0301	14 34 3.2	9.501
12	10 23 49.23	2.0286	14 24 31.0	9.573
13	10 25 50.90	2.0272	14 14 54.5	9.644
14	10 27 52.49	2.0258	14 5 13.7	9.715
15	10 29 54.00	2.0244	13 55 28.7	9.785
16	10 31 55.42	2.0230	13 45 39.5	9.855
17	10 33 56.76	2.0217	13 35 46.1	9.924
18	10 35 58.02	2.0204	13 25 48.6	9.992
19	10 37 59.21	2.0192	13 15 47.1	10.059
20	10 40 0.32	2.0179	13 5 41.5	10.126
21	10 42 1.36	2.0167	12 55 31.9	10.193
22	10 44 2.33	2.0156	12 45 18.3	10.259
23	10 46 3.23	2.0144	12 35 0.8	10.323
24	10 48 4.06	2.0133	N.12 24 39.5	10.387

WEDNESDAY 3.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	10 48 4.06	2.0133	N.12 24 39.5	10.387
1	10 50 4.83	2.0122	12 14 14.4	10.451
2	10 52 5.53	2.0112	12 3 45.4	10.515
3	10 54 6.17	2.0102	11 53 12.6	10.577
4	10 56 6.75	2.0093	11 42 36.1	10.638
5	10 58 7.28	2.0084	11 31 56.0	10.698
6	11 0 7.76	2.0075	11 21 12.3	10.758
7	11 2 8.18	2.0067	11 10 25.0	10.818
8	11 4 8.56	2.0059	10 59 34.1	10.877
9	11 6 8.89	2.0052	10 48 39.7	10.936
10	11 8 9.18	2.0045	10 37 41.8	10.993
11	11 10 9.43	2.0038	10 26 40.5	11.050
12	11 12 9.64	2.0032	10 15 35.8	11.107
13	11 14 9.82	2.0027	10 4 27.7	11.162
14	11 16 9.96	2.0021	9 53 16.4	11.216
15	11 18 10.07	2.0016	9 42 1.8	11.270
16	11 20 10.15	2.0012	9 30 44.0	11.323
17	11 22 10.21	2.0008	9 19 23.0	11.376
18	11 24 10.25	2.0005	9 7 58.9	11.427
19	11 26 10.27	2.0002	8 56 31.7	11.478
20	11 28 10.28	2.0000	8 45 1.5	11.529
21	11 30 10.27	1.9998	8 33 28.2	11.580
22	11 32 10.25	1.9997	8 21 51.9	11.628
23	11 34 10.23	1.9996	N. 8 10 12.8	11.676

THURSDAY 4.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	11 36 10.20	1.9995	N. 7 58 30.8	11.723
1	11 38 10.17	1.9996	7 46 46.0	11.770
2	11 40 10.15	1.9997	7 34 58.4	11.817
3	11 42 10.13	1.9998	7 23 8.0	11.862
4	11 44 10.12	2.0000	7 11 14.9	11.907
5	11 46 10.13	2.0003	6 59 19.2	11.950
6	11 48 10.16	2.0007	6 47 20.9	11.993
7	11 50 10.21	2.0010	6 35 20.0	12.036
8	11 52 10.28	2.0013	6 23 16.6	12.077
9	11 54 10.37	2.0018	6 11 10.7	12.118
10	11 56 10.49	2.0023	5 59 2.4	12.158
11	11 58 10.65	2.0029	5 46 51.7	12.197
12	12 0 10.84	2.0035	5 34 38.7	12.236
13	12 2 11.07	2.0043	5 22 23.4	12.274
14	12 4 11.35	2.0051	5 10 5.9	12.311
15	12 6 11.68	2.0059	4 57 46.1	12.347
16	12 8 12.06	2.0068	4 45 24.2	12.382
17	12 10 12.50	2.0077	4 33 0.3	12.416
18	12 12 12.99	2.0087	4 20 34.3	12.450
19	12 14 13.54	2.0098	4 8 6.3	12.483
20	12 16 14.16	2.0109	3 55 36.4	12.515
21	12 18 14.85	2.0122	3 43 4.5	12.547
22	12 20 15.62	2.0135	3 30 30.7	12.577
23	12 22 16.47	2.0148	3 17 55.2	12.606
24	12 24 17.40	2.0162	N. 3 5 18.0	12.634

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

FRIDAY 5.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	12 24 17.40	2.0162	N. 3 5 18.0	12.634
1	12 26 18.41	2.0176	2 52 39.1	12.662
2	12 28 19.51	2.0191	2 39 58.5	12.690
3	12 30 20.71	2.0207	2 27 16.3	12.717
4	12 32 22.00	2.0223	2 14 32.5	12.742
5	12 34 23.39	2.0241	2 1 47.3	12.765
6	12 36 24.89	2.0259	1 49 0.7	12.788
7	12 38 26.50	2.0278	1 36 12.7	12.811
8	12 40 28.22	2.0297	1 23 23.4	12.834
9	12 42 30.06	2.0317	1 10 32.7	12.855
10	12 44 32.02	2.0337	0 57 40.8	12.874
11	12 46 34.11	2.0358	0 44 47.8	12.892
12	12 48 36.32	2.0380	0 31 53.7	12.910
13	12 50 38.67	2.0403	0 18 58.6	12.927
14	12 52 41.16	2.0426	N. 0 6 2.4	12.944
15	12 54 43.79	2.0450	S. 0 6 54.7	12.959
16	12 56 46.56	2.0475	0 19 52.7	12.973
17	12 58 49.49	2.0501	0 32 51.5	12.987
18	13 0 52.57	2.0527	0 45 51.1	12.999
19	13 2 55.81	2.0553	0 58 51.4	13.011
20	13 4 59.21	2.0581	1 11 52.4	13.021
21	13 7 2.78	2.0609	1 24 53.9	13.029
22	13 9 6.52	2.0638	1 37 55.9	13.038
23	13 11 10.44	2.0667	S. 1 50 58.4	13.046

SATURDAY 6.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	13 13 14.54	2.0696	S. 2 4 1.4	13.052
1	13 15 18.82	2.0729	2 17 4.7	13.057
2	13 17 23.29	2.0761	2 30 8.3	13.061
3	13 19 27.96	2.0794	2 43 12.0	13.064
4	13 21 32.82	2.0828	2 56 15.9	13.066
5	13 23 37.89	2.0862	3 9 19.9	13.067
6	13 25 43.16	2.0896	3 22 23.9	13.066
7	13 27 48.64	2.0932	3 35 27.8	13.065
8	13 29 54.34	2.0968	3 48 31.7	13.063
9	13 32 0.25	2.1004	4 1 35.4	13.059
10	13 34 6.39	2.1041	4 14 38.8	13.054
11	13 36 12.75	2.1079	4 27 41.9	13.049
12	13 38 19.34	2.1118	4 40 44.7	13.042
13	13 40 26.17	2.1158	4 53 47.0	13.034
14	13 42 33.24	2.1199	5 6 48.8	13.024
15	13 44 40.56	2.1240	5 19 49.9	13.013
16	13 46 48.12	2.1282	5 32 50.4	13.002
17	13 48 55.94	2.1324	5 45 50.2	12.989
18	13 51 4.01	2.1367	5 58 49.1	12.974
19	13 53 12.34	2.1411	6 11 47.1	12.959
20	13 55 20.94	2.1456	6 24 44.2	12.943
21	13 57 29.82	2.1502	6 37 40.3	12.925
22	13 59 38.97	2.1547	6 50 35.2	12.906
23	14 1 48.39	2.1593	7 3 29.0	12.886
24	14 3 58.09	2.1641	S. 7 16 21.5	12.863

SUNDAY 7.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	14 3 58.09	2.1641	S. 7 16 21.5	12.863
1	14 6 8.08	2.1689	7 29 12.6	12.840
2	14 8 18.36	2.1738	7 42 2.3	12.816
3	14 10 28.94	2.1787	7 54 50.5	12.790
4	14 12 39.81	2.1837	8 7 37.1	12.763
5	14 14 50.98	2.1888	8 20 22.1	12.735
6	14 17 2.46	2.1939	8 33 5.3	12.705
7	14 19 14.25	2.1991	8 45 46.7	12.674
8	14 21 26.35	2.2043	8 58 26.2	12.641
9	14 23 38.77	2.2097	9 11 3.6	12.607
10	14 25 51.51	2.2151	9 23 39.0	12.572
11	14 28 4.58	2.2205	9 36 12.2	12.534
12	14 30 17.97	2.2260	9 48 43.1	12.496
13	14 32 31.70	2.2316	10 1 11.7	12.457
14	14 34 45.76	2.2372	10 13 37.9	12.415
15	14 37 0.16	2.2429	10 26 1.5	12.372
16	14 39 14.90	2.2486	10 38 22.5	12.328
17	14 41 29.99	2.2544	10 50 40.9	12.282
18	14 43 45.43	2.2603	11 2 56.4	12.234
19	14 46 1.22	2.2662	11 15 9.0	12.186
20	14 48 17.37	2.2722	11 27 18.7	12.136
21	14 50 33.88	2.2782	11 39 25.3	12.083
22	14 52 50.75	2.2842	11 51 28.7	12.030
23	14 55 7.99	2.2903	S. 12 3 28.9	11.975

MONDAY 8.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	14 57 25.59	2.2964	S. 12 15 25.7	11.918
1	14 59 43.56	2.3026	12 27 19.0	11.859
2	15 2 1.91	2.3089	12 39 8.8	11.800
3	15 4 20.63	2.3152	12 50 55.0	11.738
4	15 6 39.73	2.3215	13 2 37.4	11.675
5	15 8 59.21	2.3279	13 14 16.0	11.611
6	15 11 19.08	2.3343	13 25 50.7	11.544
7	15 13 39.33	2.3407	13 37 21.3	11.476
8	15 15 59.97	2.3472	13 48 47.8	11.406
9	15 18 21.00	2.3537	14 0 10.0	11.334
10	15 20 42.42	2.3603	14 11 27.9	11.261
11	15 23 4.24	2.3669	14 22 41.3	11.186
12	15 25 26.45	2.3735	14 33 50.2	11.109
13	15 27 49.06	2.3802	14 44 54.4	11.031
14	15 30 12.07	2.3868	14 55 53.9	10.952
15	15 32 35.47	2.3934	15 6 48.6	10.870
16	15 34 59.28	2.4001	15 17 38.3	10.786
17	15 37 23.49	2.4068	15 28 22.9	10.701
18	15 39 48.10	2.4136	15 39 2.4	10.614
19	15 42 13.12	2.4203	15 49 36.6	10.526
20	15 44 38.54	2.4270	16 0 5.4	10.434
21	15 47 4.36	2.4337	16 10 28.7	10.342
22	15 49 30.59	2.4405	16 20 46.4	10.248
23	15 51 57.22	2.4473	16 30 58.5	10.153
24	15 54 24.26	2.4541	S. 16 41 4.8	10.056

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 9.					**THURSDAY 11.**				
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	15 54 24.26	2.4541	S. 16 41 4.8	10.056	0	17 59 15.27	2.7180	S. 22 19 22.8	3.462
1	15 56 51.71	2.4608	16 51 5.2	9.956	1	18 1 58.44	2.7210	22 22 45.5	3.293
2	15 59 19.56	2.4675	17 0 59.5	9.854	2	18 4 41.79	2.7238	22 25 58.0	3.123
3	16 1 47.81	2.4742	17 10 47.7	9.752	3	18 7 25.30	2.7265	22 29 0.2	2.952
4	16 4 16.47	2.4810	17 20 29.7	9.648	4	18 10 8.97	2.7290	22 31 52.2	2.780
5	16 6 45.53	2.4877	17 30 5.4	9.542	5	18 12 52.78	2.7313	22 34 33.8	2.607
6	16 9 14.99	2.4944	17 39 34.7	9.433	6	18 15 36.72	2.7334	22 37 5.1	2.435
7	16 11 44.86	2.5011	17 48 57.4	9.323	7	18 18 20.79	2.7354	22 39 26.0	2.262
8	16 14 15.13	2.5077	17 58 13.5	9.212	8	18 21 4.97	2.7372	22 41 36.5	2.087
9	16 16 45.79	2.5143	18 7 22.8	9.098	9	18 23 49.26	2.7389	22 43 36.5	1.912
10	16 19 16.85	2.5210	18 16 25.3	8.983	10	18 26 33.64	2.7404	22 45 26.0	1.737
11	16 21 48.31	2.5276	18 25 20.8	8.867	11	18 29 18.11	2.7418	22 47 5.0	1.562
12	16 24 20.16	2.5341	18 34 9.3	8.748	12	18 32 2.66	2.7430	22 48 33.4	1.386
13	16 26 52.40	2.5406	18 42 50.6	8.628	13	18 34 47.27	2.7440	22 49 51.3	1.210
14	16 29 25.03	2.5471	18 51 24.6	8.506	14	18 37 31.94	2.7448	22 50 58.6	1.033
15	16 31 58.05	2.5535	18 59 51.3	8.382	15	18 40 16.65	2.7454	22 51 55.3	0.857
16	16 34 31.45	2.5598	19 8 10.5	8.257	16	18 43 1.39	2.7459	22 52 41.4	0.680
17	16 37 5.23	2.5661	19 16 22.1	8.130	17	18 45 46.16	2.7462	22 53 16.9	0.504
18	16 39 39.38	2.5724	19 24 26.1	8.002	18	18 48 30.94	2.7463	22 53 41.9	0.327
19	16 42 13.91	2.5786	19 32 22.3	7.871	19	18 51 15.72	2.7463	22 53 56.2	− 0.150
20	16 44 48.81	2.5847	19 40 10.6	7.738	20	18 54 0.50	2.7462	22 53 59.9	+ 0.028
21	16 47 24.07	2.5907	19 47 50.9	7.605	21	18 56 45.26	2.7458	22 53 52.9	0.205
22	16 49 59.69	2.5967	19 55 23.2	7.470	22	18 59 29.99	2.7453	22 53 35.3	0.381
23	16 52 35.67	2.6027	S. 20 2 47.3	7.333	23	19 2 14.69	2.7446	S. 22 53 7.2	0.557
WEDNESDAY 10.					**FRIDAY 12.**				
0	16 55 12.01	2.6086	S. 20 10 3.2	7.195	0	19 4 59.34	2.7436	S. 22 52 28.5	0.733
1	16 57 48.70	2.6143	20 17 10.7	7.055	1	19 7 43.93	2.7426	22 51 39.2	0.910
2	17 0 25.73	2.6199	20 24 9.8	6.913	2	19 10 28.45	2.7413	22 50 39.3	1.087
3	17 3 3.09	2.6255	20 31 0.3	6.770	3	19 13 12.89	2.7398	22 49 28.8	1.263
4	17 5 40.79	2.6311	20 37 42.2	6.626	4	19 15 57.23	2.7382	22 48 7.8	1.438
5	17 8 18.82	2.6366	20 44 15.4	6.480	5	19 18 41.48	2.7366	22 46 36.3	1.612
6	17 10 57.18	2.6420	20 50 39.8	6.332	6	19 21 25.62	2.7347	22 44 54.4	1.786
7	17 13 35.86	2.6472	20 56 55.3	6.183	7	19 24 9.64	2.7326	22 43 2.0	1.960
8	17 16 14.84	2.6523	21 3 1.8	6.033	8	19 26 53.53	2.7303	22 40 59.2	2.133
9	17 18 54.13	2.6573	21 8 59.3	5.882	9	19 29 37.28	2.7279	22 38 46.0	2.306
10	17 21 33.72	2.6622	21 14 47.6	5.729	10	19 32 20.88	2.7254	22 36 22.5	2.478
11	17 24 13.60	2.6670	21 20 26.7	5.574	11	19 35 4.33	2.7227	22 33 48.7	2.649
12	17 26 53.76	2.6717	21 25 56.5	5.418	12	19 37 47.61	2.7198	22 31 4.6	2.820
13	17 29 34.20	2.6763	21 31 16.9	5.262	13	19 40 30.71	2.7168	22 28 10.3	2.990
14	17 32 14.92	2.6808	21 36 27.9	5.103	14	19 43 13.62	2.7136	22 25 5.8	3.159
15	17 34 55.90	2.6852	21 41 29.3	4.943	15	19 45 56.34	2.7102	22 21 51.2	3.327
16	17 37 37.14	2.6893	21 46 21.1	4.783	16	19 48 38.85	2.7067	22 18 26.6	3.494
17	17 40 18.62	2.6933	21 51 3.3	4.622	17	19 51 21.15	2.7031	22 14 51.9	3.661
18	17 43 0.34	2.6972	21 55 35.8	4.460	18	19 54 3.22	2.6993	22 11 7.3	3.826
19	17 45 42.29	2.7011	21 59 58.5	4.296	19	19 56 45.06	2.6953	22 7 12.8	3.990
20	17 48 24.47	2.7048	22 4 11.3	4.131	20	19 59 26.66	2.6913	22 3 8.5	4.153
21	17 51 6.87	2.7084	22 8 14.2	3.965	21	20 2 8.02	2.6872	21 58 54.4	4.316
22	17 53 49.48	2.7117	22 12 7.1	3.798	22	20 4 49.12	2.6828	21 54 30.6	4.477
23	17 56 32.28	2.7149	22 15 50.0	3.631	23	20 7 29.96	2.6783	21 49 57.2	4.637
24	17 59 15.27	2.7180	S. 22 19 22.8	3.462	24	20 10 10.52	2.6737	S. 21 45 14.2	4.796

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SATURDAY 13.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	20 10 10.52	2.6737	S. 21 45 14.2	4.796
1	20 12 50.80	2.6690	21 40 21.7	4.953
2	20 15 30.80	2.6642	21 35 19.8	5.108
3	20 18 10.50	2.6592	21 30 8.7	5.263
4	20 20 49.90	2.6541	21 24 48.3	5.418
5	20 23 28.99	2.6489	21 19 18.6	5.571
6	20 26 7.77	2.6436	21 13 39.8	5.722
7	20 28 46.22	2.6382	21 7 52.0	5.871
8	20 31 24.35	2.6328	21 1 55.3	6.018
9	20 34 2.15	2.6272	20 55 49.8	6.165
10	20 36 39.61	2.6214	20 49 35.5	6.311
11	20 39 16.72	2.6156	20 43 12.5	6.454
12	20 41 53.48	2.6097	20 36 41.0	6.596
13	20 44 29.88	2.6037	20 30 1.0	6.737
14	20 47 5.92	2.5977	20 23 12.6	6.876
15	20 49 41.60	2.5915	20 16 15.9	7.014
16	20 52 16.91	2.5853	20 9 10.9	7.150
17	20 54 51.84	2.5789	20 1 57.9	7.283
18	20 57 26.38	2.5725	19 54 36.9	7.416
19	21 0 0.54	2.5661	19 47 8.0	7.547
20	21 2 34.31	2.5597	19 39 31.2	7.677
21	21 5 7.70	2.5532	19 31 46.7	7.805
22	21 7 40.69	2.5465	19 23 54.6	7.931
23	21 10 13.28	2.5397	S. 19 15 55.0	8.055

SUNDAY 14.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	21 12 45.46	2.5330	S. 19 7 48.0	8.177
1	21 15 17.24	2.5262	18 59 33.7	8.298
2	21 17 48.61	2.5195	18 51 12.2	8.418
3	21 20 19.58	2.5127	18 42 43.5	8.537
4	21 22 50.13	2.5057	18 34 7.8	8.652
5	21 25 20.26	2.4987	18 25 25.3	8.765
6	21 27 49.98	2.4918	18 16 36.0	8.877
7	21 30 19.28	2.4848	18 7 40.0	8.988
8	21 32 48.16	2.4778	17 58 37.4	9.097
9	21 35 16.62	2.4708	17 49 28.4	9.203
10	21 37 44.66	2.4637	17 40 13.0	9.309
11	21 40 12.27	2.4567	17 30 51.3	9.413
12	21 42 39.46	2.4496	17 21 23.4	9.515
13	21 45 6.22	2.4425	17 11 49.5	9.614
14	21 47 32.56	2.4354	17 2 9.7	9.712
15	21 49 58.47	2.4283	16 52 24.0	9.809
16	21 52 23.95	2.4212	16 42 32.6	9.903
17	21 54 49.01	2.4141	16 32 35.6	9.996
18	21 57 13.64	2.4069	16 22 33.1	10.087
19	21 59 37.84	2.3998	16 12 25.1	10.177
20	22 2 1.62	2.3927	16 2 11.8	10.264
21	22 4 24.97	2.3857	15 51 53.4	10.349
22	22 6 47.90	2.3787	15 41 29.9	10.434
23	22 9 10.41	2.3716	15 31 1.3	10.517
24	22 11 32.49	2.3645	S. 15 20 27.8	10.598

MONDAY 15.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	22 11 32.49	2.3645	S. 15 20 27.8	10.598
1	22 13 54.15	2.3575	15 9 49.5	10.677
2	22 16 15.39	2.3505	14 59 6.6	10.753
3	22 18 36.21	2.3435	14 48 19.1	10.829
4	22 20 56.61	2.3365	14 37 27.1	10.903
5	22 23 16.59	2.3296	14 26 30.7	10.975
6	22 25 36.16	2.3227	14 15 30.1	11.045
7	22 27 55.31	2.3158	14 4 25.3	11.114
8	22 30 14.05	2.3090	13 53 16.4	11.182
9	22 32 32.39	2.3022	13 42 3.4	11.248
10	22 34 50.32	2.2954	13 30 46.6	11.312
11	22 37 7.84	2.2887	13 19 26.0	11.373
12	22 39 24.96	2.2820	13 8 1.8	11.433
13	22 41 41.68	2.2753	12 56 34.0	11.493
14	22 43 58.00	2.2687	12 45 2.6	11.551
15	22 46 13.93	2.2622	12 33 27.9	11.606
16	22 48 29.47	2.2557	12 21 49.9	11.661
17	22 50 44.62	2.2492	12 10 8.6	11.714
18	22 52 59.38	2.2427	11 58 24.2	11.765
19	22 55 13.75	2.2363	11 46 36.8	11.814
20	22 57 27.74	2.2301	11 34 46.5	11.862
21	22 59 41.36	2.2239	11 22 53.3	11.910
22	23 1 54.61	2.2177	11 10 57.3	11.955
23	23 4 7.49	2.2116	S. 10 58 58.7	11.997

TUESDAY 16.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	23 6 20.00	2.2054	S. 10 46 57.6	12.039
1	23 8 32.14	2.1993	10 34 54.0	12.081
2	23 10 43.92	2.1934	10 22 47.9	12.121
3	23 12 55.35	2.1875	10 10 39.5	12.158
4	23 15 6.42	2.1816	9 58 28.9	12.195
5	23 17 17.14	2.1757	9 46 16.1	12.230
6	23 19 27.51	2.1700	9 34 1.3	12.263
7	23 21 37.54	2.1643	9 21 44.5	12.296
8	23 23 47.23	2.1587	9 9 25.8	12.327
9	23 25 56.58	2.1531	8 57 5.3	12.356
10	23 28 5.60	2.1476	8 44 43.1	12.384
11	23 30 14.30	2.1422	8 32 19.2	12.412
12	23 32 22.67	2.1368	8 19 53.7	12.438
13	23 34 30.72	2.1315	8 7 26.7	12.462
14	23 36 38.45	2.1262	7 54 58.3	12.484
15	23 38 45.87	2.1211	7 42 28.6	12.506
16	23 40 52.98	2.1160	7 29 57.6	12.527
17	23 42 59.79	2.1110	7 17 25.4	12.547
18	23 45 6.30	2.1060	7 4 52.0	12.565
19	23 47 12.51	2.1011	6 52 17.6	12.582
20	23 49 18.43	2.0963	6 39 42.2	12.598
21	23 51 24.07	2.0916	6 27 5.9	12.612
22	23 53 29.42	2.0868	6 14 28.8	12.625
23	23 55 34.49	2.0822	6 1 50.9	12.637
24	23 57 39.28	2.0776	S. 5 49 12.3	12.649

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

WEDNESDAY 17.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	23 57 39.28	2.0776	S. 5 49 12.3	12.649
1	23 59 43.80	2.0731	5 36 33.0	12.659
2	0 1 48.06	2.0687	5 23 53.2	12.667
3	0 3 52.05	2.0643	5 11 12.9	12.675
4	0 5 55.78	2.0601	4 58 32.2	12.682
5	0 7 59.26	2.0560	4 45 51.1	12.687
6	0 10 2.50	2.0519	4 33 9.7	12.692
7	0 12 5.49	2.0478	4 20 28.0	12.696
8	0 14 8.24	2.0437	4 7 46.2	12.698
9	0 16 10.74	2.0398	3 55 4.3	12.699
10	0 18 13.01	2.0360	3 42 22.3	12.699
11	0 20 15.06	2.0322	3 29 40.4	12.698
12	0 22 16.88	2.0285	3 16 58.5	12.697
13	0 24 18.48	2.0249	3 4 16.7	12.695
14	0 26 19.87	2.0214	2 51 35.1	12.691
15	0 28 21.05	2.0179	2 38 53.8	12.686
16	0 30 22.02	2.0144	2 26 12.8	12.681
17	0 32 22.78	2.0110	2 13 32.1	12.675
18	0 34 23.34	2.0078	2 0 51.8	12.667
19	0 36 23.71	2.0046	1 48 12.0	12.659
20	0 38 23.89	2.0014	1 35 32.7	12.649
21	0 40 23.88	1.9983	1 22 54.1	12.638
22	0 42 23.69	1.9954	1 10 16.1	12.628
23	0 44 23.33	1.9925	S. 0 57 38.7	12.617

THURSDAY 18.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	0 46 22.79	1.9896	S. 0 45 2.1	12.604
1	0 48 22.08	1.9868	0 32 26.3	12.590
2	0 50 21.21	1.9841	0 19 51.3	12.576
3	0 52 20.18	1.9815	S. 0 7 17.2	12.561
4	0 54 18.99	1.9789	N. 0 5 16.0	12.544
5	0 56 17.65	1.9764	0 17 48.1	12.527
6	0 58 16.16	1.9740	0 30 19.2	12.509
7	1 0 14.53	1.9717	0 42 49.2	12.491
8	1 2 12.76	1.9693	0 55 18.1	12.472
9	1 4 10.85	1.9671	1 7 45.8	12.451
10	1 6 8.81	1.9649	1 20 12.2	12.430
11	1 8 6.64	1.9628	1 32 37.4	12.409
12	1 10 4.35	1.9608	1 45 1.3	12.386
13	1 12 1.94	1.9589	1 57 23.8	12.362
14	1 13 59.42	1.9571	2 9 44.8	12.338
15	1 15 56.79	1.9552	2 22 4.4	12.314
16	1 17 54.05	1.9534	2 34 22.5	12.288
17	1 19 51.20	1.9517	2 46 39.0	12.261
18	1 21 48.25	1.9501	2 58 53.9	12.234
19	1 23 45.21	1.9486	3 11 7.1	12.207
20	1 25 42.08	1.9471	3 23 18.7	12.179
21	1 27 38.86	1.9457	3 35 28.6	12.150
22	1 29 35.56	1.9443	3 47 36.7	12.119
23	1 31 32.18	1.9430	3 59 42.9	12.088
24	1 33 28.72	1.9417	N. 4 11 47.3	12.057

FRIDAY 19.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	1 33 28.72	1.9417	N. 4 11 47.3	12.057
1	1 35 25.19	1.9406	4 23 49.8	12.025
2	1 37 21.59	1.9395	4 35 50.3	11.993
3	1 39 17.93	1.9385	4 47 48.9	11.960
4	1 41 14.21	1.9375	4 59 45.5	11.926
5	1 43 10.43	1.9366	5 11 40.0	11.890
6	1 45 6.60	1.9358	5 23 32.3	11.854
7	1 47 2.72	1.9350	5 35 22.5	11.818
8	1 48 58.80	1.9342	5 47 10.5	11.782
9	1 50 54.83	1.9335	5 58 56.4	11.746
10	1 52 50.82	1.9329	6 10 40.0	11.707
11	1 54 46.78	1.9323	6 22 21.3	11.668
12	1 56 42.70	1.9318	6 34 0.2	11.629
13	1 58 38.60	1.9314	6 45 36.8	11.589
14	2 0 34.47	1.9310	6 57 10.9	11.548
15	2 2 30.32	1.9307	7 8 42.6	11.507
16	2 4 26.16	1.9305	7 20 11.8	11.466
17	2 6 21.98	1.9303	7 31 38.5	11.424
18	2 8 17.79	1.9302	7 43 2.7	11.381
19	2 10 13.60	1.9301	7 54 24.2	11.337
20	2 12 9.40	1.9300	8 5 43.1	11.292
21	2 14 5.20	1.9300	8 16 59.3	11.247
22	2 16 1.00	1.9301	8 28 12.8	11.202
23	2 17 56.81	1.9302	N. 8 39 23.5	11.156

SATURDAY 20.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	2 19 52.63	1.9304	N. 8 50 31.5	11.109
1	2 21 48.46	1.9307	9 1 36.6	11.062
2	2 23 44.31	1.9310	9 12 38.9	11.014
3	2 25 40.18	1.9313	9 23 38.3	10.966
4	2 27 36.07	1.9317	9 34 34.8	10.917
5	2 29 31.99	1.9322	9 45 28.3	10.867
6	2 31 27.93	1.9327	9 56 18.8	10.817
7	2 33 23.91	1.9333	10 7 6.3	10.766
8	2 35 19.92	1.9339	10 17 50.7	10.714
9	2 37 15.97	1.9345	10 28 32.0	10.662
10	2 39 12.06	1.9352	10 39 10.1	10.609
11	2 41 8.19	1.9359	10 49 45.1	10.556
12	2 43 4.37	1.9367	11 0 16.9	10.502
13	2 45 0.60	1.9376	11 10 45.4	10.448
14	2 46 56.88	1.9384	11 21 10.7	10.393
15	2 48 53.21	1.9393	11 31 32.6	10.337
16	2 50 49.60	1.9403	11 41 51.1	10.281
17	2 52 46.05	1.9414	11 52 6.3	10.225
18	2 54 42.57	1.9425	12 2 18.1	10.168
19	2 56 39.15	1.9436	12 12 26.4	10.110
20	2 58 35.80	1.9447	12 22 31.3	10.052
21	3 0 32.51	1.9458	12 32 32.6	9.992
22	3 2 29.30	1.9471	12 42 30.3	9.939
23	3 4 26.17	1.9484	12 52 24.5	9.873
24	3 6 23.11	1.9498	N.13 2 15.1	9.813

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	SUNDAY 21.					**TUESDAY 23.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	3 6 23.11	1.9498	N.13 2 15.1	9.813	0	4 42 4.51	2.0455	N.19 32 39.2	6.243
1	3 8 20.13	1.9511	13 12 2.0	9.751	1	4 44 7.31	2.0478	19 38 51.1	6.155
2	3 10 17.24	1.9525	13 21 45.2	9.689	2	4 46 10.25	2.0502	19 44 57.8	6.067
3	3 12 14.43	1.9539	13 31 24.7	9.627	3	4 48 13.33	2.0525	19 50 59.2	5.978
4	3 14 11.71	1.9554	13 41 0.4	9.563	4	4 50 16.55	2.0548	19 56 55.2	5.888
5	3 16 9.08	1.9568	13 50 32.3	9.500	5	4 52 19.90	2.0571	20 2 45.8	5.799
6	3 18 6.53	1.9583	14 0 0.4	9.436	6	4 54 23.40	2.0595	20 8 31.1	5.709
7	3 20 4.08	1.9600	14 9 24.6	9.371	7	4 56 27.04	2.0618	20 14 10.9	5.618
8	3 22 1.73	1.9616	14 18 44.9	9.306	8	4 58 30.81	2.0640	20 19 45.3	5.527
9	3 23 59.47	1.9632	14 28 1.3	9.941	9	5 0 34.72	2.0663	20 25 14.2	5.436
10	3 25 57.31	1.9649	14 37 13.8	9.174	10	5 2 38.77	2.0687	20 30 37.6	5.344
11	3 27 55.26	1.9666	14 46 22.2	9.107	11	5 4 42.96	2.0710	20 35 55.5	5.251
12	3 29 53.31	1.9684	14 55 26.6	9.040	12	5 6 47.29	2.0732	20 41 7.8	5.158
13	3 31 51.47	1.9702	15 4 27.0	8.972	13	5 8 51.75	2.0754	20 46 14.5	5.065
14	3 33 49.73	1.9719	15 13 23.2	8.903	14	5 10 56.34	2.0777	20 51 15.6	4.971
15	3 35 48.10	1.9737	15 22 15.3	8.834	15	5 13 1.07	2.0799	20 56 11.0	4.877
16	3 37 46.58	1.9756	15 31 3.3	8.765	16	5 15 5.93	2.0821	21 1 0.8	4.782
17	3 39 45.18	1.9776	15 39 47.1	8.694	17	5 17 10.92	2.0844	21 5 44.8	4.686
18	3 41 43.89	1.9795	15 48 26.6	8.623	18	5 19 16.05	2.0866	21 10 23.1	4.590
19	3 43 42.72	1.9814	15 57 1.9	8.551	19	5 21 21.31	2.0887	21 14 55.6	4.494
20	3 45 41.66	1.9833	16 5 32.8	8.479	20	5 23 26.69	2.0908	21 19 22.4	4.398
21	3 47 40.72	1.9853	16 13 59.4	8.407	21	5 25 32.20	2.0929	21 23 43.4	4.301
22	3 49 39.90	1.9873	16 22 21.7	8.334	22	5 27 37.84	2.0950	21 27 58.5	4.203
23	3 51 39.20	1.9894	N.16 30 39.5	8.260	23	5 29 43.60	2.0971	N.21 32 7.7	4.104
	MONDAY 22.					**WEDNESDAY 24.**			
0	3 53 38.63	1.9915	N.16 38 52.9	8.186	0	5 31 49.49	2.0992	N.21 36 11.0	4.006
1	3 55 38.18	1.9936	16 47 1.9	8.111	1	5 33 55.50	2.1012	21 40 8.4	3.907
2	3 57 37.86	1.9957	16 55 6.3	8.036	2	5 36 1.63	2.1032	21 43 59.8	3.807
3	3 59 37.67	1.9978	17 3 6.2	7.961	3	5 38 7.88	2.1052	21 47 45.3	3.708
4	4 1 37.60	1.9999	17 11 1.6	7.884	4	5 40 14.25	2.1072	21 51 24.8	3.608
5	4 3 37.66	2.0021	17 18 52.3	7.807	5	5 42 20.74	2.1091	21 54 58.3	3.507
6	4 5 37.85	2.0043	17 26 38.4	7.730	6	5 44 27.34	2.1109	21 58 25.7	3.407
7	4 7 38.17	2.0065	17 34 19.9	7.652	7	5 46 34.05	2.1128	22 1 47.1	3.306
8	4 9 38.63	2.0087	17 41 56.6	7.573	8	5 48 40.88	2.1147	22 5 2.4	3.204
9	4 11 39.22	2.0109	17 49 28.6	7.494	9	5 50 47.82	2.1166	22 8 11.6	3.102
10	4 13 39.94	2.0132	17 56 55.9	7.415	10	5 52 54.87	2.1183	22 11 14.6	2.999
11	4 15 40.80	2.0155	18 4 18.4	7.334	11	5 55 2.02	2.1200	22 14 11.5	2.897
12	4 17 41.80	2.0177	18 11 36.0	7.253	12	5 57 9.27	2.1217	22 17 2.3	2.795
13	4 19 42.93	2.0200	18 18 48.8	7.172	13	5 59 16.62	2.1234	22 19 46.9	2.691
14	4 21 44.20	2.0223	18 25 56.7	7.090	14	6 1 24.08	2.1252	22 22 25.2	2.587
15	4 23 45.61	2.0246	18 32 59.6	7.007	15	6 3 31.64	2.1268	22 24 57.3	2.483
16	4 25 47.15	2.0269	18 39 57.6	6.925	16	6 5 39.29	2.1283	22 27 23.2	2.379
17	4 27 48.83	2.0292	18 46 50.6	6.842	17	6 7 47.04	2.1299	22 29 42.8	2.275
18	4 29 50.65	2.0315	18 53 38.6	6.758	18	6 9 54.88	2.1314	22 31 56.2	2.171
19	4 31 52.61	2.0338	19 0 21.5	6.673	19	6 12 2.81	2.1329	22 34 3.3	2.065
20	4 33 54.71	2.0362	19 6 59.4	6.588	20	6 14 10.83	2.1343	22 36 4.0	1.959
21	4 35 56.95	2.0385	19 13 32.1	6.502	21	6 16 18.93	2.1357	22 37 58.4	1.853
22	4 37 59.33	2.0408	19 19 59.6	6.416	22	6 18 27.12	2.1371	22 39 46.4	1.748
23	4 40 1.85	2.0432	19 26 22.0	6.330	23	6 20 35.38	2.1384	22 41 28.1	1.642
24	4 42 4.51	2.0455	N.19 32 39.2	6.243	24	6 22 43.72	2.1397	N.22 43 3.4	1.535

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	THURSDAY 25.					SATURDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	6 22 43.72	2.1397	N.22 43 3.4	1.535	0	8 6 3.16	2.1477	N.21 51 50.4	3.665
1	6 24 52.14	2.1409	22 44 32.3	1.428	1	8 8 12.00	2.1468	21 48 7.3	3.772
2	6 27 0.63	2.1421	22 45 54.8	1.321	2	8 10 20.78	2.1458	21 44 17.8	3.878
3	6 29 9.19	2.1432	22 47 10.8	1.214	3	8 12 29.50	2.1448	21 40 22.0	3.983
4	6 31 17.82	2.1443	22 48 20.4	1.107	4	8 14 38.16	2.1437	21 36 19.9	4.088
5	6 33 26.51	2.1454	22 49 23.6	1.000	5	8 16 46.75	2.1427	21 32 11.5	4.193
6	6 35 35.27	2.1465	22 50 20.4	0.892	6	8 18 55.28	2.1416	21 27 56.8	4.298
7	6 37 44.09	2.1475	22 51 10.7	0.784	7	8 21 3.74	2.1404	21 23 35.8	4.402
8	6 39 52.97	2.1484	22 51 54.5	0.676	8	8 23 12.13	2.1392	21 19 8.6	4.505
9	6 42 1.90	2.1492	22 52 31.8	0.567	9	8 25 20.45	2.1380	21 14 35.2	4.608
10	6 44 10.88	2.1501	22 53 2.6	0.459	10	8 27 28.69	2.1367	21 9 55.6	4.712
11	6 46 19.91	2.1509	22 53 26.9	0.351	11	8 29 36.86	2.1355	21 5 9.8	4.815
12	6 48 28.99	2.1517	22 53 44.7	0.242	12	8 31 44.95	2.1342	21 0 17.8	4.917
13	6 50 38.11	2.1524	22 53 56.0	0.133	13	8 33 52.96	2.1328	20 55 19.7	5.019
14	6 52 47.27	2.1531	22 54 0.7	+ 0.024	14	8 36 0.88	2.1313	20 50 15.5	5.121
15	6 54 56.48	2.1537	22 53 58.9	− 0.084	15	8 38 8.72	2.1299	20 45 5.2	5.222
16	6 57 5.72	2.1542	22 53 50.6	0.193	16	8 40 16.47	2.1285	20 39 48.9	5.322
17	6 59 14.99	2.1547	22 53 35.7	0.302	17	8 42 24.14	2.1271	20 34 26.5	5.423
18	7 1 24.29	2.1552	22 53 14.3	0.412	18	8 44 31.72	2.1255	20 28 58.1	5.523
19	7 3 33.62	2.1557	22 52 46.3	0.521	19	8 46 39.20	2.1239	20 23 23.7	5.623
20	7 5 42.97	2.1560	22 52 11.8	0.630	20	8 48 46.59	2.1224	20 17 43.3	5.722
21	7 7 52.34	2.1563	22 51 30.7	0.740	21	8 50 53.89	2.1208	20 11 57.0	5.821
22	7 10 1.73	2.1566	22 50 43.0	0.849	22	8 53 1.09	2.1192	20 6 4.8	5.919
23	7 12 11.14	2.1569	N.22 49 48.8	0.958	23	8 55 8.19	2.1176	N.20 0 6.7	6.017
	FRIDAY 26.					SUNDAY 28.			
0	7 14 20.56	2.1571	N.22 48 48.0	1.067	0	8 57 15.20	2.1160	N.19 54 2.8	6.114
1	7 16 29.99	2.1572	22 47 40.7	1.177	1	8 59 22.11	2.1143	19 47 53.0	6.211
2	7 18 39.43	2.1573	22 46 26.8	1.287	2	9 1 28.91	2.1125	19 41 37.5	6.307
3	7 20 48.87	2.1573	22 45 6.3	1.396	3	9 3 35.61	2.1108	19 35 16.2	6.403
4	7 22 58.31	2.1573	22 43 39.3	1.505	4	9 5 42.21	2.1091	19 28 49.1	6.498
5	7 25 7.75	2.1573	22 42 5.7	1.615	5	9 7 48.70	2.1073	19 22 16.4	6.593
6	7 27 17.19	2.1572	22 40 25.5	1.724	6	9 9 55.09	2.1056	19 15 38.0	6.688
7	7 29 26.62	2.1571	22 38 38.8	1.833	7	9 12 1.37	2.1038	19 8 53.9	6.781
8	7 31 36.04	2.1569	22 36 45.6	1.942	8	9 14 7.54	2.1020	19 2 4.2	6.874
9	7 33 45.45	2.1566	22 34 45.8	2.051	9	9 16 13.61	2.1002	18 55 9.0	6.967
10	7 35 54.84	2.1563	22 32 39.5	2.159	10	9 18 19.57	2.0984	18 48 8.2	7.059
11	7 38 4.21	2.1560	22 30 26.7	2.267	11	9 20 25.42	2.0966	18 41 1.9	7.150
12	7 40 13.56	2.1557	22 28 7.4	2.376	12	9 22 31.16	2.0947	18 33 50.2	7.241
13	7 42 22.89	2.1553	22 25 41.6	2.485	13	9 24 36.79	2.0929	18 26 33.0	7.332
14	7 44 32.19	2.1548	22 23 9.2	2.594	14	9 26 42.31	2.0910	18 19 10.4	7.422
15	7 46 41.46	2.1543	22 20 30.3	2.702	15	9 28 47.71	2.0891	18 11 42.3	7.512
16	7 48 50.70	2.1537	22 17 45.0	2.809	16	9 30 53.00	2.0872	18 4 8.9	7.600
17	7 50 59.90	2.1531	22 14 53.2	2.917	17	9 32 58.18	2.0853	17 56 30.3	7.688
18	7 53 9.07	2.1525	22 11 54.9	3.025	18	9 35 3.24	2.0834	17 48 46.4	7.776
19	7 55 18.20	2.1518	22 8 50.2	3.132	19	9 37 8.19	2.0816	17 40 57.2	7.862
20	7 57 27.29	2.1511	22 5 39.1	3.239	20	9 39 13.03	2.0797	17 33 2.9	7.948
21	7 59 36.33	2.1503	22 2 21.5	3.346	21	9 41 17.75	2.0778	17 25 3.4	8.034
22	8 1 45.33	2.1495	21 58 57.5	3.453	22	9 43 22.36	2.0759	17 16 58.8	8.119
23	8 3 54.27	2.1486	21 55 27.1	3.559	23	9 45 26.86	2.0740	17 8 49.1	8.203
24	8 6 3.16	2.1477	N.21 51 50.4	3.665	24	9 47 31.24	2.0721	N.17 0 34.4	8.287

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

MONDAY 29.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	9 47 31.24	2.0721	N.17 0 34.4	8.287
1	9 49 35.51	2.0702	16 52 14.7	8.370
2	9 51 39.66	2.0683	16 43 50.0	8.453
3	9 53 43.70	2.0664	16 35 20.3	8.535
4	9 55 47.63	2.0646	16 26 45.8	8.616
5	9 57 51.45	2.0627	16 18 6.4	8.697
6	9 59 55.15	2.0608	16 9 22.2	8.776
7	10 1 58.74	2.0589	16 0 33.3	8.855
8	10 4 2.22	2.0571	15 51 39.6	8.934
9	10 6 5.59	2.0552	15 42 41.2	9.012
10	10 8 8.85	2.0534	15 33 38.1	9.089
11	10 10 12.00	2.0516	15 24 30.5	9.165
12	10 12 15.04	2.0498	15 15 18.3	9.241
13	10 14 17.97	2.0480	15 6 1.6	9.316
14	10 16 20.80	2.0462	14 56 40.4	9.391
15	10 18 23.52	2.0445	14 47 14.7	9.465
16	10 20 26.14	2.0427	14 37 44.6	9.538
17	10 22 28.65	2.0410	14 28 10.2	9.610
18	10 24 31.06	2.0393	14 18 31.4	9.682
19	10 26 33.37	2.0376	14 8 48.4	9.752
20	10 28 35.58	2.0359	13 59 1.2	9.822
21	10 30 37.68	2.0343	13 49 9.7	9.892
22	10 32 39.69	2.0327	13 39 14.1	9.961
23	10 34 41.60	2.0310	N.13 29 14.4	10.028

TUESDAY 30.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	10 36 43.41	2.0294	N.13 19 10.7	10.095
1	10 38 45.13	2.0279	13 9 3.0	10.162
2	10 40 46.76	2.0263	12 58 51.3	10.228
3	10 42 48.29	2.0249	12 48 35.6	10.293
4	10 44 49.74	2.0234	12 38 16.1	10.357
5	10 46 51.10	2.0220	12 27 52.8	10.421
6	10 48 52.38	2.0206	12 17 25.6	10.484
7	10 50 53.57	2.0192	12 6 54.7	10.546
8	10 52 54.68	2.0179	11 56 20.1	10.607
9	10 54 55.71	2.0165	11 45 41.8	10.668
10	10 56 56.66	2.0152	11 34 59.9	10.727
11	10 58 57.54	2.0140	11 24 14.5	10.786
12	11 0 58.34	2.0128	11 13 25.6	10.844
13	11 2 59.07	2.0116	11 2 33.2	10.902
14	11 4 59.73	2.0104	10 51 37.3	10.959
15	11 7 0.31	2.0092	10 40 38.1	11.014
16	11 9 0.83	2.0082	10 29 35.6	11.069
17	11 11 1.29	2.0072	10 18 29.8	11.124
18	11 13 1.69	2.0062	10 7 20.7	11.178
19	11 15 2.03	2.0052	9 56 8.4	11.231
20	11 17 2.31	2.0042	9 44 53.0	11.283
21	11 19 2.53	2.0032	9 33 34.5	11.334
22	11 21 2.70	2.0024	9 22 12.9	11.385
23	11 23 2.82	2.0017	9 10 48.3	11.434
24	11 25 2.90	2.0009	N. 8 59 20.8	11.482

WEDNESDAY 31.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	11 25 2.90	2.0009	N. 8 59 20.8	11.482
1	11 27 2.93	2.0002	8 47 50.4	11.531
2	11 29 2.92	1.9995	8 36 17.1	11.579
3	11 31 2.87	1.9988	8 24 40.9	11.626
4	11 33 2.78	1.9982	8 13 2.0	11.671
5	11 35 2.66	1.9977	8 1 20.4	11.715
6	11 37 2.51	1.9972	7 49 36.2	11.759
7	11 39 2.33	1.9968	7 37 49.3	11.803
8	11 41 2.13	1.9964	7 25 59.8	11.846
9	11 43 1.90	1.9960	7 14 7.8	11.887
10	11 45 1.65	1.9957	7 2 13.4	11.927
11	11 47 1.39	1.9955	6 50 16.6	11.967
12	11 49 1.11	1.9953	6 38 17.4	12.007
13	11 51 0.82	1.9951	6 26 15.8	12.045
14	11 53 0.52	1.9950	6 14 12.0	12.082
15	11 55 0.22	1.9950	6 2 6.0	12.118
16	11 56 59.92	1.9950	5 49 57.8	12.155
17	11 58 59.62	1.9950	5 37 47.4	12.191
18	12 0 59.32	1.9951	5 25 34.9	12.225
19	12 2 59.03	1.9952	5 13 20.4	12.259
20	12 4 58.75	1.9955	5 1 3.9	12.291
21	12 6 58.49	1.9958	4 48 45.5	12.322
22	12 8 58.25	1.9961	4 36 25.3	12.352
23	12 10 58.02	1.9964	N. 4 24 3.3	12.382

THURSDAY, AUGUST 1.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	12 12 57.81	1.9968	N. 4 11 39.5	12.412

PHASES OF THE MOON.

		d	h	m
☽ First Quarter . .	July	5	17	58.7
○ Full Moon		12	9	1.7
☾ Last Quarter		19	7	44.9
● New Moon		27	12	0.5

		d	h
☾ Perigee	July	11	13.5
☾ Apogee		24	3.7

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Sun	W.	34° 25′ 41″	3314	35° 49′ 36″	3306	37° 13′ 40″	3300	38° 37′ 52″	3292
	Spica	E.	68 20 59	3001	66 50 48	2995	65 20 29	2989	63 50 3	2983
	Antares	E.	114 15 22	3004	112 45 14	2997	111 14 57	2989	109 44 30	2981
2	Sun	W.	45 41 14	3949	47 6 25	3940	48 31 47	3931	49 57 20	3920
	Spica	E.	56 15 58	2953	54 44 45	2946	53 13 24	2939	51 41 55	2932
	Antares	E.	102 9 46	2939	100 38 17	2931	99 6 37	2921	97 34 45	2912
3	Sun	W.	57 8 7	3168	58 34 55	3156	60 1 57	3144	61 29 13	3133
	Saturn	W.	20 29 12	2884	22 1 51	2870	23 34 48	2857	25 8 2	2845
	Spica	E.	44 2 23	2900	42 30 4	2894	40 57 38	2888	39 25 4	2883
	Antares	E.	89 52 22	2862	88 19 14	2852	86 45 53	2842	85 12 19	2831
	Jupiter	E.	113 29 41	2783	111 54 51	2772	110 19 46	2761	108 44 27	2750
4	Sun	W.	68 49 19	3068	70 18 8	3054	71 47 14	3040	73 16 37	3026
	Saturn	W.	32 58 20	2779	34 33 15	2766	36 8 28	2753	37 43 58	2738
	Regulus	W.	23 29 8	2777	25 4 6	2760	26 39 27	2743	28 15 10	2725
	Spica	E.	31 40 52	2869	30 7 53	2869	28 34 55	2873	27 2 1	2879
	Antares	E.	77 20 48	2772	75 45 44	2760	74 10 24	2747	72 34 47	2735
	Jupiter	E.	100 44 9	2692	99 7 18	2679	97 30 10	2666	95 52 45	2653
5	Sun	W.	80 48 6	2950	82 19 21	2935	83 50 56	2919	85 22 51	2903
	Saturn	W.	45 46 11	2668	47 23 36	2652	49 1 21	2637	50 39 26	2621
	Regulus	W.	36 19 16	2645	37 57 10	2629	39 35 26	2612	41 14 4	2596
	Antares	E.	64 32 30	2670	62 55 10	2657	61 17 33	2644	59 39 38	2631
	Jupiter	E.	87 41 6	2584	86 1 49	2570	84 22 13	2555	82 42 16	2540
6	Sun	W.	93 7 40	2819	94 41 43	2802	96 16 8	2785	97 50 55	2768
	Saturn	W.	58 55 10	2543	60 35 24	2526	62 16 1	2510	63 57 0	2494
	Regulus	W.	49 32 47	2515	51 13 39	2499	52 54 54	2482	54 36 33	2465
	Antares	E.	51 25 32	2565	49 45 49	2553	48 5 49	2540	46 25 31	2528
	Jupiter	E.	74 17 20	2464	72 35 16	2448	70 52 50	2432	69 10 1	2417
	α Aquilæ	E.	98 15 18	3177	96 48 41	3157	95 21 40	3137	93 54 15	3119
7	Sun	W.	105 50 36	2681	107 27 42	2663	109 5 11	2646	110 43 4	2629
	Saturn	W.	72 27 40	2412	74 10 58	2396	75 54 39	2379	77 38 44	2363
	Regulus	W.	63 10 38	2382	64 54 38	2366	66 39 2	2350	68 23 49	2333
	Antares	E.	38 0 7	2477	36 18 21	2470	34 36 25	2464	32 54 21	2460
	Jupiter	E.	60 30 16	2337	58 45 10	2320	56 59 40	2304	55 13 47	2289
	α Aquilæ	E.	86 31 53	3039	85 2 29	3026	83 32 49	3014	82 2 54	3004
8	Sun	W.	118 58 16	2545	120 38 27	2528	122 19 1	2512	123 59 58	2496
	Saturn	W.	86 24 57	2283	88 11 21	2268	89 58 7	2253	91 45 15	2239
	Regulus	W.	77 13 38	2253	79 0 46	2239	80 48 16	2224	82 36 8	2208
	Spica	W.	24 4 54	2450	25 47 17	2410	27 30 37	2375	29 14 48	2344
	Jupiter	E.	46 18 35	2211	44 30 24	2196	42 41 50	2181	40 52 54	2167
	α Aquilæ	E.	74 30 42	2974	72 59 57	2973	71 29 11	2974	69 58 26	2977
9	Spica	W.	38 5 54	2222	39 53 49	2203	41 42 13	2184	43 31 4	2168
	Jupiter	E.	31 42 56	2099	29 51 56	2087	28 0 37	2075	26 9 0	2064
	α Aquilæ	E.	62 26 35	3030	60 57 0	3051	59 27 50	3075	57 59 10	3104
	Fomalhaut	E.	93 25 43	2327	91 40 23	2314	89 54 44	2302	88 8 48	2291

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Sun	W.	40° 2′ 13″	3283	41° 26′ 44″	3276	42° 51′ 24″	3267	44° 16′ 14″	3259
	Spica	E.	62 19 29	2977	60 48 47	2971	59 17 58	2965	57 47 2	2959
	Antares	E.	108 13 54	2973	106 43 8	2965	105 12 11	2957	103 41 4	2948
2	Sun	W.	51 23 5	3210	52 49 2	3200	54 15 11	3189	55 41 33	3179
	Spica	E.	50 10 17	2926	48 38 31	2920	47 6 37	2912	45 34 34	2906
	Antares	E.	96 2 41	2902	94 30 25	2893	92 57 57	2883	91 25 16	2873
3	Sun	W.	62 56 43	3120	64 24 28	3107	65 52 29	3094	67 20 46	3081
	Saturn	W.	26 41 32	2831	28 15 19	2819	29 49 22	2806	31 23 42	2792
	Spica	E.	37 52 24	2879	36 19 38	2874	34 46 46	2871	33 13 50	2869
	Antares	E.	83 38 31	2819	82 4 28	2808	80 30 10	2796	78 55 37	2784
	Jupiter	E.	107 8 54	2739	105 33 6	2728	103 57 3	2716	102 20 44	2704
4	Sun	W.	74 46 18	3011	76 16 17	2997	77 46 34	2981	79 17 10	2965
	Saturn	W.	39 19 47	2724	40 55 55	2710	42 32 21	2696	44 9 6	2681
	Regulus	W.	29 51 16	2709	31 27 44	2693	33 4 33	2677	34 41 44	2661
	Spica	E.	25 29 15	2888	23 56 41	2903	22 24 26	2924	20 52 38	2954
	Antares	E.	70 58 53	2722	69 22 43	2710	67 46 16	2697	66 9 32	2684
	Jupiter	E.	94 15 2	2640	92 37 1	2626	90 58 42	2612	89 20 4	2598
5	Sun	W.	86 55 6	2887	88 27 42	2869	90 0 40	2853	91 33 59	2836
	Saturn	W.	52 17 52	2606	53 56 39	2590	55 35 48	2574	57 15 18	2559
	Regulus	W.	42 53 4	2580	44 32 26	2564	46 12 11	2548	47 52 18	2532
	Antares	E.	58 1 25	2618	56 22 54	2604	54 44 5	2591	53 4 57	2578
	Jupiter	E.	81 1 59	2525	79 21 21	2510	77 40 22	2495	75 59 2	2480
6	Sun	W.	99 26 5	2750	101 1 38	2733	102 37 34	2716	104 13 53	2698
	Saturn	W.	65 38 22	2477	67 20 7	2461	69 2 15	2445	70 44 46	2429
	Regulus	W.	56 18 35	2449	58 1 0	2432	59 43 49	2415	61 27 2	2399
	Antares	E.	44 44 57	2517	43 4 7	2505	41 23 1	2495	39 41 41	2485
	Jupiter	E.	67 26 50	2401	65 43 16	2384	63 59 19	2368	62 14 59	2353
	α Aquilæ	E.	92 26 28	3101	90 58 19	3083	89 29 49	3068	88 1 0	3053
7	Sun	W.	112 21 20	2612	113 59 59	2595	115 39 1	2577	117 18 27	2561
	Saturn	W.	79 23 12	2347	81 8 3	2331	82 53 18	2315	84 38 56	2299
	Regulus	W.	70 9 0	2317	71 54 34	2301	73 40 32	2285	75 26 53	2269
	Antares	E.	31 12 12	2458	29 30 0	2460	27 47 50	2465	26 5 47	2475
	Jupiter	E.	53 27 31	2273	51 40 52	2257	49 53 49	2241	48 6 23	2227
	α Aquilæ	E.	80 32 46	2995	79 2 27	2988	77 31 59	2981	76 1 23	2977
8	Sun	W.	125 41 17	2481	127 22 57	2466	129 4 58	2451	130 47 20	2437
	Saturn	W.	93 32 45	2224	95 20 37	2210	97 8 50	2196	98 57 24	2182
	Regulus	W.	84 24 23	2194	86 13 0	2180	88 1 58	2167	89 51 16	2153
	Spica	W.	30 59 44	2315	32 45 21	2289	34 31 37	2264	36 18 29	2242
	Jupiter	E.	39 3 36	2153	37 13 57	2139	35 23 57	2126	33 33 37	2112
	α Aquilæ	E.	68 27 44	2981	66 57 8	2989	65 26 42	3001	63 56 30	3014
9	Spica	W.	45 20 20	2152	47 10 0	2137	49 0 2	2124	50 50 25	2111
	Jupiter	E.	24 17 6	2053	22 24 55	2044	20 32 29	2034	18 39 48	2026
	α Aquilæ	E.	56 31 5	3137	55 3 40	3175	53 37 1	3220	52 11 15	3271
	Fomalhaut	E.	86 22 35	2281	84 36 7	2271	82 49 25	2262	81 2 30	2255

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
10	Spica	W.	52° 41′ 7″	2099	54° 32′ 7″	2088	56° 23′ 24″	2079	58° 14′ 56″	2069
	α Aquilæ	E.	50 46 30	3330	49 22 53	3396	48 0 32	3473	46 39 38	3560
	Fomalhaut	E.	79 15 24	2249	77 28 9	2243	75 40 45	2239	73 53 15	2235
	α Pegasi	E.	95 54 48	2454	94 12 30	2443	92 29 57	2435	90 47 12	2427
11	Spica	W.	67 35 43	2037	69 28 20	2033	71 21 3	2030	73 13 51	2027
	Antares	W.	22 19 31	2249	24 6 46	2210	25 54 58	2180	27 43 55	2157
	Fomalhaut	E.	64 55 13	2240	63 7 45	2245	61 20 24	2252	59 33 14	2261
	α Pegasi	E.	82 11 26	2412	80 28 8	2413	78 44 52	2417	77 1 41	2422
12	Spica	W.	82 38 18	2029	84 31 7	2032	86 23 52	2035	88 16 31	2040
	Antares	W.	36 55 38	2094	38 46 46	2089	40 38 2	2086	42 29 23	2085
	Fomalhaut	E.	50 41 42	2338	48 56 38	2362	47 12 9	2389	45 28 18	2419
	α Pegasi	E.	68 28 28	2475	66 46 40	2492	65 5 16	2512	63 24 19	2533
13	Antares	W.	51 45 56	2098	53 36 59	2104	55 27 52	2111	57 18 34	2119
	JUPITER	W.	28 57 8	2009	30 50 29	2017	32 43 37	2026	34 36 30	2037
	Fomalhaut	E.	37 2 8	2651	35 24 22	2719	33 48 8	2798	32 13 37	2889
	α Pegasi	E.	55 8 21	2687	53 31 23	2727	51 55 19	2772	50 20 15	2823
	α Arietis	E.	96 18 38	2186	94 29 50	2194	92 41 14	2204	90 52 52	2214
14	Antares	W.	66 28 37	2171	68 17 48	2184	70 6 40	2197	71 55 12	2211
	JUPITER	W.	43 56 41	2096	45 47 46	2110	47 38 30	2124	49 28 53	2138
	α Arietis	E.	81 55 13	2278	80 8 41	2294	78 22 32	2309	76 36 46	2326
	VENUS	E.	111 30 52	2427	109 47 56	2442	108 5 21	2458	106 23 8	2473
	Aldebaran	E.	112 57 37	2133	111 7 28	2146	109 17 39	2160	107 28 11	2175
15	Antares	W.	80 52 25	2289	82 38 41	2305	84 24 33	2322	86 10 1	2339
	JUPITER	W.	58 35 2	2218	60 23 3	2235	62 10 39	2252	63 57 49	2270
	α Aquilæ	W.	43 23 12	3957	44 35 34	3867	45 49 27	3790	47 4 40	3722
	α Arietis	E.	67 54 29	2424	66 11 28	2445	64 28 58	2468	62 47 0	2492
	VENUS	E.	97 57 51	2561	96 18 2	2579	94 38 38	2598	92 59 40	2617
	Aldebaran	E.	98 26 37	2254	96 39 30	2272	94 52 49	2289	93 6 33	2307
16	JUPITER	W.	72 47 7	2360	74 31 39	2379	76 15 44	2397	77 59 23	2416
	α Aquilæ	W.	53 35 54	3497	54 56 22	3470	56 17 20	3446	57 38 45	3427
	α Arietis	E.	54 25 46	2623	52 47 22	2652	51 9 38	2683	49 32 35	2714
	Aldebaran	E.	84 21 44	2398	82 38 6	2416	80 54 54	2435	79 12 9	2453
	VENUS	E.	84 51 25	2716	83 15 6	2737	81 39 15	2757	80 3 51	2777
	SUN	E.	130 26 19	2703	128 49 43	2723	127 13 34	2743	125 37 51	2763
17	JUPITER	W.	86 31 0	2509	88 12 1	2527	89 52 37	2545	91 32 47	2564
	α Aquilæ	W.	64 30 1	3376	65 52 45	3372	67 15 33	3372	68 38 22	3372
	α Arietis	E.	41 38 34	2900	40 6 15	2944	38 34 52	2991	37 4 28	3043
	Aldebaran	E.	70 44 58	2547	69 4 50	2566	67 25 8	2585	65 45 52	2602
	VENUS	E.	72 13 28	2880	70 40 43	2899	69 8 23	2920	67 36 29	2939
	SUN	E.	117 45 53	2863	116 12 47	2883	114 40 7	2903	113 7 52	2923
18	JUPITER	W.	99 47 29	2652	101 25 14	2668	103 2 37	2685	104 39 37	2701
	α Aquilæ	W.	75 31 49	3394	76 54 12	3401	78 16 27	3410	79 38 32	3420
	Fomalhaut	W.	40 8 11	3170	41 34 56	3158	43 1 56	3148	44 29 7	3141
	Aldebaran	E.	57 35 37	2692	55 58 46	2708	54 22 17	2725	52 46 11	2742

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LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
10	Spica	W.	60° 6′ 43″	2061	61° 58′ 43″	2053	63° 50′ 54″	2048	65° 43′ 14″	2042
	α Aquilæ	E.	45 20 20	3659	44 2 49	3772	42 47 18	3902	41 34 0	4049
	Fomalhaut	E.	72 5 40	2233	70 18 2	2233	68 30 24	2234	66 42 47	2236
	α Pegasi	E.	89 4 16	2421	87 21 11	2417	85 38 0	2413	83 54 44	2412
11	Spica	W.	75 6 43	2026	76 59 37	2026	78 52 31	2026	80 45 25	2026
	Antares	W.	29 33 28	2137	31 23 30	2122	33 13 56	2110	35 4 40	2101
	Fomalhaut	E.	57 46 17	2272	55 59 36	2285	54 13 14	2300	52 27 15	2318
	α Pegasi	E.	75 18 38	2429	73 35 45	2438	71 53 4	2448	70 10 37	2460
12	Spica	W.	90 9 3	2045	92 1 27	2052	93 53 41	2058	95 45 45	2066
	Antares	W.	44 20 46	2083	46 12 9	2086	48 3 29	2089	49 54 45	2092
	Fomalhaut	E.	43 45 11	2455	42 2 54	2494	40 21 33	2540	38 41 15	2591
	α Pegasi	E.	61 43 52	2558	60 3 59	2585	58 24 43	2615	56 46 9	2649
13	Antares	W.	59 9 4	2128	60 59 20	2137	62 49 22	2148	64 39 8	2159
	JUPITER	W.	36 29 7	2047	38 21 28	2059	40 13 31	2070	42 5 16	2083
	Fomalhaut	E.	30 41 4	2996	29 10 46	3121	27 43 2	3270	26 18 15	3447
	α Pegasi	E.	48 46 17	2878	47 13 30	2939	45 42 1	3007	44 11 57	3082
	α Arietis	E.	89 4 45	2225	87 16 54	2237	85 29 21	2249	83 42 7	2263
14	Antares	W.	73 43 23	2225	75 31 13	2240	77 18 41	2256	79 5 45	2272
	JUPITER	W.	51 18 54	2153	53 8 32	2169	54 57 46	2185	56 46 36	2201
	α Arietis	E.	74 51 24	2344	73 6 28	2363	71 22 0	2382	69 38 0	2403
	VENUS	E.	104 41 17	2489	102 59 49	2507	101 18 45	2525	99 38 6	2542
	Aldebaran	E.	105 39 6	2190	103 50 24	2206	102 2 5	2221	100 14 9	2237
15	Antares	W.	87 55 4	2357	89 39 41	2375	91 23 51	2394	93 7 35	2412
	JUPITER	W.	65 44 33	2287	67 30 51	2305	69 16 43	2324	71 2 8	2342
	α Aquilæ	W.	48 21 4	3663	49 38 30	3611	50 56 52	3567	52 16 2	3529
	α Arietis	E.	61 5 35	2516	59 24 44	2541	57 44 28	2567	56 4 48	2595
	VENUS	E.	91 21 8	2636	89 43 2	2656	88 5 23	2676	86 28 11	2695
	Aldebaran	E.	91 20 43	2324	89 35 19	2342	87 50 21	2360	86 5 49	2379
16	JUPITER	W.	79 42 35	2434	81 25 21	2453	83 7 40	2472	84 49 33	2490
	α Aquilæ	W.	59 0 31	3411	60 22 35	3399	61 44 53	3388	63 7 23	3381
	α Arietis	E.	47 56 14	2748	46 20 38	2783	44 45 48	2820	43 11 46	2859
	Aldebaran	E.	77 29 50	2472	75 47 58	2491	74 6 32	2510	72 25 32	2528
	VENUS	E.	78 28 53	2798	76 54 22	2818	75 20 18	2838	73 46 40	2859
	SUN	E.	124 2 35	2783	122 27 45	2804	120 53 22	2824	119 19 25	2843
17	JUPITER	W.	93 12 32	2581	94 51 53	2599	96 30 49	2617	98 9 21	2635
	α Aquilæ	W.	70 1 11	3373	71 23 58	3377	72 46 41	3382	74 9 18	3387
	α Arietis	E.	35 35 8	3098	34 6 56	3158	32 39 57	3225	31 14 17	3300
	Aldebaran	E.	64 7 0	2620	62 28 32	2638	60 50 29	2657	59 12 51	2675
	VENUS	E.	66 5 0	2959	64 33 56	2979	63 3 17	2998	61 33 2	3018
	SUN	E.	111 36 2	2942	110 4 37	2962	108 33 36	2981	107 2 59	2999
18	JUPITER	W.	106 16 15	2717	107 52 32	2733	109 28 28	2748	111 4 4	2763
	α Aquilæ	W.	81 0 26	3430	82 22 9	3440	83 43 40	3452	85 4 58	3463
	Fomalhaut	W.	45 56 27	3135	47 23 54	3132	48 51 25	3130	50 18 58	3129
	Aldebaran	E.	51 10 27	2759	49 35 5	2775	48 0 4	2791	46 25 24	2806

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LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
18	VENUS	E.	60° 3′ 11″	3036	58° 33′ 43″	3055	57° 4′ 38″	3073	55° 35′ 55″	3091
	SUN	E.	105 32 45	3018	104 2 54	3036	102 33 26	3055	101 4 21	3073
19	α Aquilæ	W.	86 26 3	3476	87 46 54	3489	89 7 30	3502	90 27 52	3516
	Fomalhaut	W.	51 46 32	3130	53 14 5	3132	54 41 36	3134	56 9 4	3138
	Aldebaran	E.	44 51 4	2821	43 17 3	2836	41 43 22	2851	40 10 0	2865
	VENUS	E.	48 17 45	3177	46 51 8	3193	45 24 50	3208	43 58 50	3223
	SUN	E.	93 44 10	3155	92 17 7	3171	90 50 23	3187	89 23 58	3202
20	Fomalhaut	W.	63 25 14	3160	64 52 11	3165	66 19 2	3170	67 45 47	3176
	α Pegasi	W.	49 21 8	3661	50 38 37	3639	51 56 29	3621	53 14 41	3605
	Aldebaran	E.	32 27 37	2932	30 55 59	2945	29 24 37	2958	27 53 31	2969
	VENUS	E.	36 53 9	3293	35 28 49	3305	34 4 43	3318	32 40 52	3329
	SUN	E.	82 16 6	3269	80 51 18	3282	79 26 45	3293	78 2 25	3305
21	Fomalhaut	W.	74 57 52	3203	76 23 58	3209	77 49 57	3214	79 15 50	3218
	α Pegasi	W.	59 49 27	3547	61 8 59	3539	62 28 40	3533	63 48 28	3526
	VENUS	E.	25 44 46	3381	24 22 8	3390	22 59 40	3398	21 37 21	3407
	SUN	E.	71 3 55	3354	69 40 46	3364	68 17 48	3372	66 54 59	3379
22	Fomalhaut	W.	86 23 51	3242	87 49 11	3246	89 14 26	3250	90 39 36	3254
	α Pegasi	W.	70 28 59	3504	71 49 19	3500	73 9 43	3497	74 30 10	3496
	α Arietis	W.	27 12 4	3818	28 26 48	3750	29 42 42	3693	30 59 36	3645
	SUN	E.	60 2 57	3411	58 40 53	3416	57 18 55	3422	55 57 3	3425
23	Fomalhaut	W.	97 44 20	3271	99 9 5	3275	100 33 46	3278	101 58 23	3282
	α Pegasi	W.	81 13 1	3486	82 33 41	3485	83 54 22	3484	85 15 4	3483
	α Arietis	W.	37 35 20	3475	38 56 12	3452	40 17 30	3431	41 39 11	3413
	SUN	E.	49 8 44	3441	47 47 14	3443	46 25 46	3445	45 4 20	3446
24	α Pegasi	W.	91 58 46	3481	93 19 31	3481	94 40 16	3482	96 1 0	3482
	α Arietis	W.	48 32 29	3337	49 55 58	3325	51 19 41	3313	52 43 37	3303
	SUN	E.	38 17 24	3447	36 56 1	3447	35 34 38	3446	34 13 14	3445
25	α Arietis	W.	59 46 14	3255	61 11 18	3247	62 36 32	3239	64 1 55	3231
	Aldebaran	W.	27 23 13	3080	28 51 47	3075	30 20 27	3070	31 49 13	3065
	VENUS	W.	17 39 9	3463	19 0 15	3458	20 21 26	3454	21 42 41	3451
	SUN	E.	27 25 51	3438	26 4 17	3436	24 42 41	3434	23 21 3	3431
29	SUN	W.	17 12 28	3264	18 37 22	3252	20 2 30	3240	21 27 52	3229
	Spica	E.	59 10 4	2932	57 38 26	2927	56 6 41	2920	54 34 48	2915
	Antares	E.	105 4 20	2924	103 32 31	2916	102 0 32	2908	100 28 23	2900
30	SUN	W.	28 37 48	3178	30 4 23	3168	31 31 10	3159	32 58 8	3150
	Spica	E.	46 53 40	2889	45 21 7	2884	43 48 28	2880	42 15 44	2876
	Antares	E.	92 45 5	2859	91 11 54	2851	89 38 32	2843	88 5 0	2835
	JUPITER	E.	113 34 59	2797	112 0 27	2789	110 25 45	2781	108 50 52	2772
31	SUN	W.	40 15 56	3100	41 44 6	3090	43 12 28	3079	44 41 3	3069
	Spica	E.	34 31 5	2867	32 58 4	2868	31 25 4	2871	29 52 8	2875
	Antares	E.	80 14 34	2792	78 39 55	2783	77 5 5	2775	75 30 4	2766
	JUPITER	E.	100 53 41	2729	99 17 40	2721	97 41 28	2712	96 5 4	2703

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Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
18	Venus	E.	54° 7′ 35″	3110	52° 39′ 37″	3126	51° 11′ 59″	3143	49° 44′ 42″	3160
	Sun	E.	99 35 38	3090	98 7 16	3106	96 39 14	3123	95 11 32	3139
19	α Aquilæ	W.	91 47 58	3531	93 7 48	3545	94 27 22	3561	95 46 39	3577
	Fomalhaut	W.	57 36 28	3141	59 3 48	3146	60 31 2	3150	61 58 11	3155
	Aldebaran	E.	38 36 56	2879	37 4 10	2893	35 31 42	2906	33 59 31	2920
	Venus	E.	42 33 8	3237	41 7 43	3252	39 42 35	3266	38 17 44	3280
	Sun	E.	87 57 51	3216	86 32 1	3230	85 6 27	3243	83 41 9	3256
20	Fomalhaut	W.	69 12 25	3181	70 38 57	3187	72 5 22	3193	73 31 40	3198
	α Pegasi	W.	54 33 10	3590	55 51 55	3577	57 10 54	3566	58 30 5	3556
	Aldebaran	E.	26 22 40	2982	24 52 5	2994	23 21 45	3007	21 51 41	3019
	Venus	E.	31 17 14	3340	29 53 49	3351	28 30 36	3361	27 7 35	3372
	Sun	E.	76 38 19	3316	75 14 26	3326	73 50 45	3336	72 27 15	3345
21	Fomalhaut	W.	80 41 38	3223	82 7 20	3228	83 32 56	3233	84 58 26	3237
	α Pegasi	W.	65 8 23	3521	66 28 24	3515	67 48 31	3511	69 8 43	3507
	Venus	E.	20 15 12	3415	18 53 12	3422	17 31 20	3429	16 9 36	3437
	Sun	E.	65 32 19	3386	64 9 47	3393	62 47 23	3400	61 25 7	3406
22	Fomalhaut	W.	92 4 41	3258	93 29 42	3261	94 54 39	3265	96 19 31	3268
	α Pegasi	W.	75 50 39	3493	77 11 11	3490	78 31 46	3488	79 52 23	3488
	α Arietis	W.	32 17 22	3602	33 35 54	3565	34 55 7	3531	36 14 57	3501
	Sun	E.	54 35 15	3430	53 13 32	3433	51 51 53	3436	50 30 17	3438
23	Fomalhaut	W.	103 22 56	3284	104 47 26	3288	106 11 52	3291	107 36 14	3294
	α Pegasi	W.	86 35 47	3482	87 56 31	3481	89 17 16	3481	90 38 1	3481
	α Arietis	W.	43 1 13	3394	44 23 36	3379	45 46 17	3364	47 9 15	3350
	Sun	E.	43 42 55	3446	42 21 31	3447	41 0 8	3448	39 38 46	3448
24	α Pegasi	W.	97 21 44	3483	98 42 27	3485	100 3 8	3486	101 23 48	3488
	α Arietis	W.	54 7 45	3293	55 32 5	3282	56 56 37	3273	58 21 20	3264
	Sun	E.	32 51 48	3444	31 30 21	3443	30 8 53	3441	28 47 23	3439
25	α Arietis	W.	65 27 28	3223	66 53 10	3214	68 19 2	3207	69 45 3	3200
	Aldebaran	W.	33 18 5	3060	34 47 3	3056	36 16 6	3052	37 45 15	3046
	Venus	W.	23 4 0	3446	24 25 24	3443	25 46 52	3438	27 8 25	3433
	Sun	E.	21 59 22	3430	20 37 39	3429	19 15 55	3429	17 54 11	3430
29	Sun	W.	22 53 27	3219	24 19 14	3208	25 45 14	3198	27 11 25	3188
	Spica	E.	53 2 48	2909	51 30 41	2904	49 58 27	2899	48 26 7	2894
	Antares	E.	98 56 4	2892	97 23 35	2883	95 50 55	2876	94 18 5	2868
30	Sun	W.	34 25 17	3140	35 52 38	3129	37 20 12	3119	38 47 58	3110
	Spica	E.	40 42 55	2873	39 10 2	2870	37 37 5	2869	36 4 6	2867
	Antares	E.	86 31 17	2826	84 57 23	2818	83 23 18	2809	81 49 2	2800
	Jupiter	E.	107 15 48	2764	105 40 33	2756	104 5 7	2747	102 29 30	2738
31	Sun	W.	46 9 51	3058	47 38 52	3048	49 8 5	3038	50 37 31	3026
	Spica	E.	28 19 17	2881	26 46 34	2891	25 14 4	2905	23 41 52	2925
	Antares	E.	73 54 52	2757	72 19 28	2748	70 43 52	2739	69 8 4	2730
	Jupiter	E.	94 28 28	2693	92 51 39	2684	91 14 38	2675	89 37 24	2665

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	THE SUN'S Diff. for 1 Hour.	THE SUN'S Apparent Declination.	THE SUN'S Diff. for 1 Hour.	THE SUN'S Semi-diameter.	Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to / Subtracted from Apparent Time.	Diff. for 1 Hour.
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Thur.	1	8 47 13 34	9.702	N.17 55 14.5	−38.09	15 48.06	66.60	6 4.09	0.154
Frid.	2	8 51 5.86	9.676	17 39 51.5	38.82	15 48.20	66.52	6 0.06	0.180
Sat.	3	8 54 57.76	9.650	17 24 11.3	39.53	15 48.34	66.43	5 55.42	0.206
SUN.	4	8 58 49.03	9.624	17 8 14.1	−40.23	15 48.48	66.35	5 50.15	0.232
Mon.	5	9 2 39.68	9.598	16 52 0.3	40.92	15 48.63	66.26	5 44.26	0.258
Tues.	6	9 6 29.71	9.573	16 35 30.1	41.59	15 48.78	66.18	5 37.76	0.283
Wed.	7	9 10 19.14	9.547	16 18 44.0	−42.25	15 48.93	66.09	5 30.65	0.308
Thur.	8	9 14 7.97	9.522	16 1 42.3	42.90	15 49.09	66.01	5 22.94	0.333
Frid.	9	9 17 56.21	9.498	15 44 25.1	43.54	15 49.25	65.92	5 14.64	0.357
Sat.	10	9 21 43.85	9.474	15 26 52.8	−44.16	15 49.42	65.84	5 5.76	0.381
SUN.	11	9 25 30.92	9.450	15 9 5.6	44.77	15 49.58	65.76	4 56.30	0.405
Mon.	12	9 29 17.43	9.427	14 51 4.0	45.37	15 49.75	65.68	4 46.28	0.428
Tues.	13	9 33 3.39	9.404	14 32 48.2	−45.96	15 49.92	65.60	4 35.72	0.451
Wed.	14	9 36 48.81	9.382	14 14 18.5	46.53	15 50.09	65.52	4 24.62	0.473
Thur.	15	9 40 33.71	9.361	13 55 35.2	47.09	15 50.26	65.44	4 12.99	0.494
Frid.	16	9 44 18.10	9.340	13 36 38.5	−47.64	15 50.44	65.36	4 0.85	0.515
Sat.	17	9 48 1.99	9.320	13 17 28.8	48.17	15 50.62	65.28	3 48.22	0.535
SUN.	18	9 51 45.39	9.299	12 58 6.4	48.69	15 50.81	65.21	3 35.11	0.556
Mon.	19	9 55 28.31	9 279	12 38 31.6	−49.20	15 50.99	65.14	3 21.52	0.576
Tues.	20	9 59 10.77	9.260	12 18 44.7	49.70	15 51.18	65.07	3 7.46	0.595
Wed.	21	10 2 52.78	9.242	11 58 45.9	50.19	15 51.37	65.00	2 52.95	0.613
Thur.	22	10 6 34.34	9.223	11 38 35.7	−50.66	15 51.57	64.94	2 38.00	0.631
Frid.	23	10 10 15.47	9.205	11 18 14.4	51.12	15 51.77	64.87	2 22.62	0.649
Sat.	24	10 13 56.18	9.188	10 57 42.3	51.56	15 51.98	64.81	2 6.82	0.666
SUN.	25	10 17 36.49	9.171	10 36 59.6	−51.99	15 52.19	64.75	1 50 61	0.683
Mon.	26	10 21 16.40	9.155	10 16 6.8	52.41	15 52.30	64.69	1 34.01	0.699
Tues.	27	10 24 55.92	9.139	9 55 4.1	52.81	15 52.52	64.63	1 17.02	0.715
Wed.	28	10 28 35.06	9.123	9 33 52.0	−53.20	15 52.84	64.58	0 59.66	0.731
Thur.	29	10 32 13 83	9.108	9 12 30.7	53.57	15 53 06	64.53	0 41.94	0.746
Frid.	30	10 35 52.26	9.094	8 51 0.7	53.93	15 53.29	64.48	0 23.86	0.760
Sat.	31	10 39 30.35	9.080	8 29 22.2	54 27	15 53.52	64.43	0 5.43	0.774
SUN.	32	10 43 8.10	9.067	N. 8 7 35.6	−54.60	15 53.76	64.39	0 13.32	0.787

NOTE.—The mean time of semidiameter passing may be found by subtracting $0^s.18$ from the sidereal time.

The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from		Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Added to Mean Time.	Diff. for 1 Hour.	
		h m s	s	° ′ ″	″	m s	s	h m s
Thur.	1	8 47 12.36	9.702	N. 17 55 18.4	−38.09	6 4.10	0.154	8 41 8.26
Frid.	2	8 51 4.89	9.676	17 39 55.4	38.82	6 0.07	0.180	8 45 4.82
Sat.	3	8 54 56.80	9.650	17 24 15.2	39.53	5 55.43	0.206	8 49 1.37
SUN.	4	8 58 48.09	9.624	17 8 18.0	−40.23	5 50.17	0.232	8 52 57.92
Mon.	5	9 2 38.76	9.598	16 52 4.2	40.92	5 44.28	0.258	8 56 54.48
Tues.	6	9 6 28.81	9.573	16 35 34.0	41.59	5 37.78	0.283	9 0 51.03
Wed.	7	9 10 18.26	9.548	16 18 47.9	−42.25	5 30.68	0.308	9 4 47.58
Thur.	8	9 14 7.11	9.523	16 1 46.1	42.90	5 22.97	0.333	9 8 44.14
Frid.	9	9 17 55.37	9.499	15 44 28.9	43.54	5 14.67	0.357	9 12 40.70
Sat.	10	9 21 43.04	9.475	15 26 56.5	−44.16	5 5.79	0.381	9 16 37.25
SUN.	11	9 25 30.14	9.451	15 9 9.3	44.77	4 56.33	0.405	9 20 33.81
Mon.	12	9 29 16.68	9.428	14 51 7.6	45.37	4 46.31	0.428	9 24 30.37
Tues.	13	9 33 2.67	9.405	14 32 51.7	−45.96	4 35.75	0.451	9 28 26.92
Wed.	14	9 36 48.12	9.383	14 14 21.9	46.53	4 24.65	0.473	9 32 23.47
Thur.	15	9 40 33.05	9.362	13 55 38.5	47.09	4 13.02	0.494	9 36 20.03
Frid.	16	9 44 17.47	9.341	13 36 41.7	−47.64	4 0.88	0.515	9 40 16.59
Sat.	17	9 48 1.39	9.321	13 17 31.9	48.18	3 48.25	0.535	9 44 13.14
SUN.	18	9 51 44.83	9.300	12 58 9.4	48.70	3 35.14	0.556	9 48 9.69
Mon.	19	9 55 27.79	9.280	12 38 34.4	−49.21	3 21.55	0.576	9 52 6.24
Tues.	20	9 59 10.29	9.261	12 18 47.3	49.71	3 7.49	0.595	9 56 2.80
Wed.	21	10 2 52.34	9.243	11 58 48.4	50.20	2 52.98	0.613	9 59 59.36
Thur.	22	10 6 33.94	9.225	11 38 38.0	−50.67	2 38.03	0.631	10 3 55.91
Frid.	23	10 10 15.11	9.207	11 18 16.5	51.13	2 22.64	0.649	10 7 52.47
Sat.	24	10 13 55.86	9.190	10 57 44.2	51.57	2 6.84	0.666	10 11 49.02
SUN.	25	10 17 36.21	9.173	10 37 1.3	−52.00	1 50.63	0.683	10 15 45.58
Mon.	26	10 21 16.16	9.157	10 16 8.2	52.42	1 34.03	0.699	10 19 42.13
Tues.	27	10 24 55.72	9.141	9 55 5.3	52.82	1 17.04	0.715	10 23 38.68
Wed.	28	10 28 34.90	9.125	9 33 52.9	−53.21	0 59.67	0.731	10 27 35.23
Thur.	29	10 32 13.72	9.110	9 12 31.4	53.58	0 41.94	0.746	10 31 31.78
Frid.	30	10 35 52.20	9.096	8 51 1.1	53.94	0 23.86	0.760	10 35 28.34
Sat.	31	10 39 30.33	9.082	8 29 22.3	54.28	0 5.43	0.774	10 39 24.90
SUN.	32	10 43 8.13	9.069	N. 8 7 35.4	−54.61	0 13.32	0.787	10 43 21.45

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 Hour, + 9ˢ.8565. (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		λ	λ′					
		° ′ ″	′ ″	″	″			h m s
1	213	129 22 1.0	21 47.6	143.61	+ 0.30	0.0063386	−25.4	15 16 21.21
2	214	130 19 28.1	19 14.5	143.64	0.29	0.0062765	26.3	15 12 25.30
3	215	131 16 55.8	16 42.1	143.67	0.25	0.0062123	27.1	15 8 29.39
4	216	132 14 24.2	14 10.3	143.70	+ 0.18	0.0061462	−27.9	15 4 33.48
5	217	133 11 53.3	11 39.2	143.73	+ 0.09	0.0060784	28.6	15 0 37.57
6	218	134 9 23.2	9 9.0	143.76	− 0.02	0.0060090	29.2	14 56 41.66
7	219	135 6 53.9	6 39.6	143.79	− 0.15	0.0059382	−29.8	14 52 45.76
8	220	136 4 25.5	4 11.1	143.83	0.28	0.0058662	30.3	14 48 49.85
9	221	137 1 58.1	1 43.5	143.87	0.41	0.0057929	30.8	14 44 53.94
10	222	137 59 31.7	59 16.9	143.92	− 0.53	0.0057184	−31.3	14 40 58.03
11	223	138 57 6.4	56 51.5	143.97	0.63	0.0056428	31.7	14 37 2.11
12	224	139 54 42.2	54 27.3	144.02	0.72	0.0055662	32.1	14 33 6.20
13	225	140 52 19.4	52 4.3	144.08	− 0.79	0.0054886	−32.5	14 29 10.29
14	226	141 49 58.0	49 42.7	144.14	0.83	0.0054100	33.0	14 25 14.38
15	227	142 47 38.0	47 22.6	144.20	0.84	0.0053303	33.5	14 21 18.47
16	228	143 45 19.6	45 4.1	144.26	− 0.81	0.0052495	−34.0	14 17 22.56
17	229	144 43 2.7	42 47.1	144.33	0.76	0.0051674	34.5	14 13 26.65
18	230	145 40 47.4	40 31.7	144.40	0.68	0.0050839	35.1	14 9 30.75
19	231	146 38 33.8	38 17.9	144.47	− 0.57	0.0049989	−35.7	14 5 34.85
20	232	147 36 21.9	36 5.9	144.54	0.45	0.0049125	36.3	14 1 38.94
21	233	148 34 11.7	33 55.6	144.61	0.32	0.0048245	37.0	13 57 43.03
22	234	149 32 3.3	31 47.1	144.68	− 0.19	0.0047347	−37.8	13 53 47.12
23	235	150 29 56.5	29 40.2	144.75	− 0.06	0.0046429	38.6	13 49 51.21
24	236	151 27 51.4	27 35.0	144.82	+ 0.06	0.0045493	39.4	13 45 55.30
25	237	152 25 47.9	25 31.4	144.89	+ 0.16	0.0044539	−40.2	13 41 59.39
26	238	153 23 46.0	23 29.4	144.95	0.25	0.0043565	40.9	13 38 3.49
27	239	154 21 45.6	21 28.9	145.02	0.31	0.0042572	41.7	13 34 7.59
28	240	155 19 46.8	19 30.0	145.08	+ 0.34	0.0041560	−42.5	13 30 11.68
29	241	156 17 49.5	17 32.6	145.15	0.34	0.0040530	43.2	13 26 15.77
30	242	157 15 53.7	15 36.7	145.21	0.31	0.0039484	43.9	13 22 19.86
31	243	158 13 59.3	13 42.2	145.27	0.25	0.0038423	44.5	13 18 23.95
32	244	159 12 6.4	11 49.2	145.33	+ 0.16	0.0037347	−45.1	13 14 28.04

NOTE.—The numbers in column λ correspond to the true equinox of the date; in column λ′, to the mean equinox of January $0^d.0$.

Diff. for 1 Hour, $-9^s.8296$. (Table II.)

GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	15 26.8	15 31.6	56 34.7	+1.43	56 52.2	+1.49	3 38.5	1.89	4.5
2	15 36.6	15 41.7	57 10.4	1.55	57 29.2	1.60	4 24.3	1.93	5.5
3	15 47.0	15 52.4	57 48.6	1.64	58 8.4	1.66	5 11.5	2.01	6.5
4	15 57.8	16 3.2	58 28.3	+1.66	58 48.1	+1.64	6 1.2	2.14	7.5
5	16 8.4	16 13.5	59 7.5	1.59	59 26.0	1.50	6 54.2	2.29	8.5
6	16 18.2	16 22.4	59 43.3	1.37	59 58.8	1.21	7 51.1	2.46	9.5
7	16 26.1	16 29.0	60 12.2	+1.01	60 22.9	+0.77	8 51.7	2.59	10.5
8	16 31.1	16 32.2	60 30.6	+0.50	60 34.8	+0.20	9 54.5	2.64	11.5
9	16 32.3	16 31.4	60 35.2	−0.13	60 31.8	−0.45	10 57.3	2.58	12.5
10	16 29.7	16 26 4	60 24.5	−0.77	60 13.3	−1.09	11 57.9	2.45	13.5
11	16 22.3	16 17.4	59 58.5	1.37	59 40.5	1.62	12 54.9	2.29	14.5
12	16 11.8	16 5.5	59 19.7	1.82	58 56.6	2.00	13 47.9	2.13	15.5
13	15 58.7	15 51.7	58 31.9	−2.11	58 6.1	−2.17	14 37.5	2.00	16.5
14	15 44.6	15 37.4	57 39.8	2.19	57 13.5	2.17	15 24.4	1.91	17.5
15	15 30.4	15 23.7	56 47.8	2.10	56 23.1	2.00	16 9.7	1.87	18.5
16	15 17.3	15 11.5	55 59.8	−1.87	55 38.3	−1.71	16 54.4	1.86	19.5
17	15 6.2	15 1.5	55 18.8	1.53	55 1.5	1.35	17 39.3	1.88	20.5
18	14 57.4	14 54.0	54 46.6	1.15	54 34.2	0.93	18 25.0	1.93	21.5
19	14 51.3	14 49.3	54 24.3	−0.72	54 16.9	−0.52	19 11.9	1.98	22.5
20	14 48.0	14 47.3	54 12.0	−0.31	54 9.5	−0.11	20 0.0	2.03	23.5
21	14 47.3	14 47.9	54 9.4	+0.09	54 11.5	+0.27	20 49.0	2.06	24.5
22	14 49.0	14 50.7	54 15.7	+0.44	54 21.8	+0.58	21 38.5	2.06	25.5
23	14 52.8	14 55.3	54 29.6	0.72	54 39.0	0.84	22 27.8	2.04	26.5
24	14 58.2	15 1.5	54 49.7	0.95	55 1.6	1.04	23 16.4	2.00	27.5
25	15 5.0	15 8.7	55 14.4	+1.11	55 28.0	+1.16	☌		28.5
26	15 12.5	15 16.5	55 42.2	1.20	55 56.8	1.23	0 3.9	1.96	29.5
27	15 20.5	15 24.6	56 11.6	1.25	56 26.6	1.26	0 50.5	1.92	0.9
28	15 28.7	15 32.8	56 41.6	+1.25	56 56.5	+1.24	1 36.5	1.91	1.9
29	15 36.8	15 40.7	57 11.2	1.22	57 25.8	1.21	2 22.6	1.93	2.9
30	15 44.6	15 48.5	57 40.1	1.19	57 54.2	1.16	3 9.6	1.99	3.9
31	15 52.2	15 55.8	58 7.9	1.13	58 21.2	1.10	3 58.3	2.08	4.9
32	15 59.3	16 2.7	58 34.1	+1.06	58 46.5	+1.01	4 49.7	2.21	5.9

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

THURSDAY 1.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	12 12 57.81	1.9968	N. 4 11 39.5	12.412
1	12 14 57.63	1.9973	3 59 13.9	12.440
2	12 16 57.49	1.9979	3 46 46.7	12.467
3	12 18 57.38	1.9985	3 34 17.9	12.493
4	12 20 57.31	1.9992	3 21 47.6	12.519
5	12 22 57.28	1.9999	3 9 15.7	12.544
6	12 24 57.30	2.0007	2 56 42.3	12.568
7	12 26 57.37	2.0016	2 44 7.5	12.591
8	12 28 57.49	2.0024	2 31 31.4	12.612
9	12 30 57.66	2.0033	2 18 54.0	12.633
10	12 32 57.89	2.0044	2 6 15.4	12.653
11	12 34 58.19	2.0055	1 53 35.6	12.673
12	12 36 58.55	2.0066	1 40 54.6	12.692
13	12 38 58.98	2.0078	1 28 12.5	12.710
14	12 40 59.49	2.0091	1 15 29.4	12.726
15	12 43 0.07	2.0104	1 2 45.4	12.741
16	12 45 0.74	2.0118	0 50 0.5	12.756
17	12 47 1.49	2.0132	0 37 14.7	12.771
18	12 49 2.33	2.0147	0 24 28.0	12.784
19	12 51 3.26	2.0163	N. 0 11 40.6	12.796
20	12 53 4.29	2.0180	S. 0 1 7.5	12.807
21	12 55 5.42	2.0197	0 13 56.2	12.817
22	12 57 6.65	2.0214	0 26 45.5	12.826
23	12 59 7.99	2.0233	S. 0 39 35.3	12.833

FRIDAY 2.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	13 1 9.45	2.0252	S. 0 52 25.5	12.840
1	13 3 11.02	2.0272	1 5 16.1	12.847
2	13 5 12.71	2.0292	1 18 7.1	12.853
3	13 7 14.52	2.0312	1 30 58.5	12.858
4	13 9 16.46	2.0334	1 43 50.1	12.861
5	13 11 18.53	2.0357	1 56 41.8	12.863
6	13 13 20.74	2.0380	2 9 33.6	12.864
7	13 15 23.09	2.0403	2 22 25.5	12.865
8	13 17 25.58	2.0427	2 35 17.4	12.864
9	13 19 28.22	2.0452	2 48 9.2	12.862
10	13 21 31.01	2.0478	3 1 0.9	12.860
11	13 23 33.96	2.0504	3 13 52.4	12.857
12	13 25 37.06	2.0531	3 26 43.7	12.853
13	13 27 40.33	2.0559	3 39 34.7	12.847
14	13 29 43.77	2.0587	3 52 25.3	12.839
15	13 31 47.37	2.0615	4 5 15.4	12.831
16	13 33 51.15	2.0645	4 18 5.0	12.822
17	13 35 55.11	2.0675	4 30 54.1	12.812
18	13 37 59.25	2.0706	4 43 42.5	12.801
19	13 40 3.58	2.0737	4 56 30.2	12.789
20	13 42 8.10	2.0770	5 9 17.2	12.777
21	13 44 12.82	2.0803	5 22 3.4	12.763
22	13 46 17.74	2.0837	5 34 48.7	12.747
23	13 48 22.86	2.0871	5 47 33.0	12.730
24	13 50 28.19	2.0906	S. 6 0 16.3	12.712

SATURDAY 3.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	13 50 28.19	2.0906	S. 6 0 16.3	12.712
1	13 52 33.73	2.0942	6 12 58.5	12.694
2	13 54 39.49	2.0978	6 25 39.6	12.674
3	13 56 45.47	2.1015	6 38 19.4	12.653
4	13 58 51.67	2.1052	6 50 57.9	12.631
5	14 0 58.09	2.1089	7 3 35.1	12.607
6	14 3 4.74	2.1128	7 16 10.8	12.582
7	14 5 11.63	2.1168	7 28 45.0	12.557
8	14 7 18.76	2.1209	7 41 17.7	12.531
9	14 9 26.14	2.1250	7 53 48.7	12.503
10	14 11 33.76	2.1291	8 6 18.0	12.473
11	14 13 41.63	2.1332	8 18 45.5	12.442
12	14 15 49.75	2.1375	8 31 11.1	12.411
13	14 17 58.13	2.1419	8 43 34.8	12.378
14	14 20 6.78	2.1463	8 55 56.5	12.344
15	14 22 15.69	2.1507	9 8 16.1	12.309
16	14 24 24.87	2.1552	9 20 33.6	12.272
17	14 26 34.32	2.1598	9 32 48.8	12.234
18	14 28 44.05	2.1645	9 45 1.7	12.196
19	14 30 54.06	2.1692	9 57 12.3	12.156
20	14 33 4.36	2.1740	10 9 20.4	12.113
21	14 35 14.94	2.1788	10 21 25.9	12.070
22	14 37 25.81	2.1837	10 33 28.8	12.026
23	14 39 36.98	2.1886	S. 10 45 29.0	11.981

SUNDAY 4.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	14 41 48.44	2.1935	S. 10 57 26.5	11.934
1	14 44 0.20	2.1986	11 9 21.1	11.886
2	14 46 12.27	2.2037	11 21 12.8	11.837
3	14 48 24.65	2.2089	11 33 1.5	11.786
4	14 50 37.34	2.2141	11 44 47.1	11.733
5	14 52 50.34	2.2193	11 56 29.5	11.679
6	14 55 3.66	2.2246	12 8 8.6	11.624
7	14 57 17.30	2.2300	12 19 44.4	11.568
8	14 59 31.26	2.2354	12 31 16.8	11.511
9	15 1 45.55	2.2409	12 42 45.7	11.452
10	15 4 0.17	2.2464	12 54 11.0	11.391
11	15 6 15.12	2.2519	13 5 32.6	11.329
12	15 8 30.40	2.2575	13 16 50.5	11.267
13	15 10 46.02	2.2632	13 28 4.6	11.202
14	15 13 1.98	2.2688	13 39 14.7	11.135
15	15 15 18.28	2.2746	13 50 20.8	11.067
16	15 17 34.93	2.2804	14 1 22.8	10.998
17	15 19 51.93	2.2862	14 12 20.6	10.928
18	15 22 9.27	2.2920	14 23 14.2	10.857
19	15 24 26.97	2.2979	14 34 3.4	10.783
20	15 26 45.02	2.3038	14 44 48.2	10.708
21	15 29 3.42	2.3097	14 55 28.4	10.632
22	15 31 22.18	2.3157	15 6 4.0	10.554
23	15 33 41.30	2.3217	15 16 34.9	10.475
24	15 36 0.78	2.3277	S. 15 27 1.0	10.394

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

MONDAY 5.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	15 36 0.78	2.3277	S.15 27 1.0	10.394
1	15 38 20.62	2.3337	15 37 22.2	10.312
2	15 40 40.83	2.3398	15 47 38.4	10.228
3	15 43 1.40	2.3459	15 57 49.5	10.143
4	15 45 22.34	2.3521	16 7 55.5	10.056
5	15 47 43.65	2.3582	16 17 56.2	9.967
6	15 50 5.32	2.3644	16 27 51.6	9.878
7	15 52 27.37	2.3706	16 37 41.6	9.787
8	15 54 49.79	2.3767	16 47 26.0	9.693
9	15 57 12.57	2.3828	16 57 4.8	9.599
10	15 59 35.72	2.3890	17 6 37.9	9.503
11	16 1 59.25	2.3952	17 16 5.2	9.406
12	16 4 23.15	2.4014	17 25 26.6	9.307
13	16 6 47.42	2.4076	17 34 42.0	9.207
14	16 9 12.06	2.4138	17 43 51.4	9.105
15	16 11 37.08	2.4201	17 52 54.6	9.002
16	16 14 2.47	2.4262	18 1 51.6	8.897
17	16 16 28.23	2.4324	18 10 42.2	8.790
18	16 18 54.36	2.4386	18 19 26.4	8.682
19	16 21 20.86	2.4447	18 28 4.1	8.572
20	16 23 47.73	2.4509	18 36 35.1	8.461
21	16 26 14.97	2.4571	18 44 59.4	8.348
22	16 28 42.58	2.4632	18 53 16.9	8.234
23	16 31 10.55	2.4692	S.19 1 27.5	8.118

TUESDAY 6.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	16 33 38.88	2.4753	S.19 9 31.1	8.001
1	16 36 7.58	2.4813	19 17 27.6	7.882
2	16 38 36.64	2.4872	19 25 17.0	7.763
3	16 41 6.05	2.4932	19 32 59.2	7.642
4	16 43 35.82	2.4992	19 40 34.0	7.518
5	16 46 5.95	2.5051	19 48 1.4	7.394
6	16 48 36.43	2.5109	19 55 21.3	7.268
7	16 51 7.26	2.5166	20 2 33.6	7.141
8	16 53 38.43	2.5224	20 9 38.2	7.012
9	16 56 9.95	2.5281	20 16 35.0	6.882
10	16 58 41.81	2.5337	20 23 24.0	6.751
11	17 1 14.00	2.5393	20 30 5.1	6.617
12	17 3 46.53	2.5449	20 36 38.1	6.482
13	17 6 19.39	2.5503	20 43 3.0	6.347
14	17 8 52.57	2.5557	20 49 19.7	6.210
15	17 11 26.07	2.5610	20 55 28.2	6.072
16	17 13 59.89	2.5662	21 1 28.3	5.932
17	17 16 34.02	2.5714	21 7 20.0	5.792
18	17 19 8.46	2.5765	21 13 3.3	5.650
19	17 21 43.20	2.5815	21 18 38.0	5.506
20	17 24 18.24	2.5865	21 24 4.0	5.361
21	17 26 53.58	2.5913	21 29 21.3	5.215
22	17 29 29.20	2.5960	21 34 29.8	5.067
23	17 32 5.10	2.6007	21 39 29.4	4.919
24	17 34 41.28	2.6053	S.21 44 20.1	4.770

WEDNESDAY 7.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	17 34 41.28	2.6053	S.21 44 20.1	4.770
1	17 37 17.73	2.6098	21 49 1.8	4.619
2	17 39 54.45	2.6142	21 53 34.4	4.467
3	17 42 31.43	2.6184	21 57 57.9	4.315
4	17 45 8.66	2.6225	22 2 12.2	4.162
5	17 47 46.13	2.6265	22 6 17.3	4.007
6	17 50 23.84	2.6304	22 10 13.0	3.850
7	17 53 1.78	2.6343	22 13 59.3	3.693
8	17 55 39.96	2.6382	22 17 36.2	3.536
9	17 58 18.36	2.6418	22 21 3.7	3.378
10	18 0 56.97	2.6452	22 24 21.6	3.218
11	18 3 35.78	2.6485	22 27 29.9	3.058
12	18 6 14.79	2.6517	22 30 28.6	2.897
13	18 8 53.99	2.6548	22 33 17.6	2.735
14	18 11 33.37	2.6578	22 35 56.8	2.572
15	18 14 12.93	2.6607	22 38 26.2	2.408
16	18 16 52.65	2.6633	22 40 45.8	2.245
17	18 19 32.53	2.6659	22 42 55.6	2.081
18	18 22 12.56	2.6683	22 44 55.5	1.915
19	18 24 52.73	2.6706	22 46 45.4	1.749
20	18 27 33.04	2.6728	22 48 25.4	1.583
21	18 30 13.47	2.6748	22 49 55.4	1.416
22	18 32 54.02	2.6767	22 51 15.3	1.249
23	18 35 34.68	2.6784	S.22 52 25.2	1.081

THURSDAY 8.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	18 38 15.43	2.6799	S.22 53 25.0	0.912
1	18 40 56.27	2.6814	22 54 14.7	0.744
2	18 43 37.20	2.6828	22 54 54.3	0.575
3	18 46 18.21	2.6840	22 55 23.7	0.406
4	18 48 59.28	2.6849	22 55 43.0	0.237
5	18 51 40.40	2.6857	22 55 52.1	− 0.067
6	18 54 21.57	2.6865	22 55 51.1	+ 0.102
7	18 57 2.78	2.6871	22 55 39.9	0.272
8	18 59 44.02	2.6874	22 55 18.5	0.442
9	19 2 25.27	2.6876	22 54 46.9	0.612
10	19 5 6.53	2.6877	22 54 5.1	0.782
11	19 7 47.79	2.6877	22 53 13.1	0.952
12	19 10 29.05	2.6875	22 52 10.9	1.122
13	19 13 10.29	2.6871	22 50 58.5	1.291
14	19 15 51.50	2.6865	22 49 36.0	1.460
15	19 18 32.67	2.6858	22 48 3.3	1.629
16	19 21 13.80	2.6851	22 46 20.5	1.798
17	19 23 54.88	2.6842	22 44 27.5	1.967
18	19 26 35.90	2.6830	22 42 24.4	2.136
19	19 29 16.84	2.6817	22 40 11.2	2.303
20	19 31 57.70	2.6803	22 37 48.0	2.471
21	19 34 38.48	2.6788	22 35 14.7	2.638
22	19 37 19.16	2.6771	22 32 31.4	2.804
23	19 39 59.73	2.6752	22 29 38.2	2.970
24	19 42 40.19	2.6732	S.22 26 35.0	3.136

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

FRIDAY 9.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	19 42 40.19	2.6732	S.22 26 35.0	3.136
1	19 45 20.52	2.6711	22 23 21.9	3.301
2	19 48 0.72	2.6688	22 19 58.9	3.466
3	19 50 40.78	2.6664	22 16 26.0	3.630
4	19 53 20.69	2.6638	22 12 43.3	3.792
5	19 56 0.44	2.6612	22 8 50.9	3.953
6	19 58 40.03	2.6583	22 4 48.9	4.114
7	20 1 19.44	2.6553	22 0 37.2	4.276
8	20 3 58.67	2.6523	21 56 15.8	4.436
9	20 6 37.72	2.6492	21 51 44.9	4.594
10	20 9 16.57	2.6458	21 47 4.5	4.752
11	20 11 55.22	2.6423	21 42 14.6	4.909
12	20 14 33.65	2.6387	21 37 15.4	5.064
13	20 17 11.86	2.6350	21 32 6.9	5.219
14	20 19 49.85	2.6312	21 26 49.1	5.373
15	20 22 27.61	2.6273	21 21 22.1	5.526
16	20 25 5.13	2.6232	21 15 46.0	5.677
17	20 27 42.40	2.6191	21 10 0.8	5.827
18	20 30 19.42	2.6148	21 4 6.7	5.976
19	20 32 56.18	2.6106	20 58 3.7	6.124
20	20 35 32.68	2.6060	20 51 51.8	6.271
21	20 38 8.90	2.6014	20 45 31.1	6.417
22	20 40 44.85	2.5968	20 39 1.8	6.560
23	20 43 20.52	2.5921	S.20 32 23.9	6.703

SATURDAY 10.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	20 45 55.90	2.5872	S.20 25 37.4	6.845
1	20 48 30.98	2.5823	20 18 42.5	6.985
2	20 51 5.77	2.5773	20 11 39.2	7.123
3	20 53 40.26	2.5722	20 4 27.7	7.260
4	20 56 14.44	2.5670	19 57 8.0	7.397
5	20 58 48.30	2.5617	19 49 40.1	7.532
6	21 1 21.84	2.5563	19 42 4.2	7.664
7	21 3 55.06	2.5509	19 34 20.4	7.795
8	21 6 27.95	2.5454	19 26 28.8	7.925
9	21 9 0.51	2.5399	19 18 29.4	8.054
10	21 11 32.74	2.5344	19 10 22.3	8.181
11	21 14 4.64	2.5288	19 2 7.7	8.306
12	21 16 36.20	2.5231	18 53 45.6	8.430
13	21 19 7.41	2.5173	18 45 16.1	8.552
14	21 21 38.27	2.5114	18 36 39.4	8.672
15	21 24 8.78	2.5056	18 27 55.5	8.791
16	21 26 38.94	2.4997	18 19 4.5	8.908
17	21 29 8.74	2.4937	18 10 6.5	9.024
18	21 31 38.18	2.4877	18 1 1.6	9.138
19	21 34 7.26	2.4817	17 51 49.9	9.251
20	21 36 35.98	2.4756	17 42 31.5	9.361
21	21 39 4.33	2.4695	17 33 6.6	9.469
22	21 41 32.32	2.4634	17 23 35.2	9.577
23	21 43 59.94	2.4572	17 13 57.4	9.683
24	21 46 27.19	2.4511	S.17 4 13.3	9.787

SUNDAY 11.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	21 46 27.19	2.4511	S.17 4 13.3	9.787
1	21 48 54.07	2.4449	16 54 23.0	9.889
2	21 51 20.58	2.4387	16 44 26.6	9.989
3	21 53 46.71	2.4324	16 34 24.3	10.088
4	21 56 12.47	2.4262	16 24 16.1	10.185
5	21 58 37.85	2.4199	16 14 2.1	10.280
6	22 1 2.86	2.4137	16 3 42.5	10.373
7	22 3 27.49	2.4074	15 53 17.3	10.466
8	22 5 51.75	2.4012	15 42 46.6	10.556
9	22 8 15.63	2.3949	15 32 10.6	10.644
10	22 10 39.14	2.3887	15 21 29.3	10.732
11	22 13 2.27	2.3824	15 10 42.8	10.817
12	22 15 25.02	2.3761	14 59 51.3	10.900
13	22 17 47.40	2.3698	14 48 54.8	10.982
14	22 20 9.40	2.3636	14 37 53.5	11.061
15	22 22 31.03	2.3573	14 26 47.5	11.139
16	22 24 52.28	2.3511	14 15 36.8	11.216
17	22 27 13.16	2.3449	14 4 21.6	11.290
18	22 29 33.67	2.3387	13 53 2.0	11.363
19	22 31 53.81	2.3326	13 41 38.0	11.435
20	22 34 13.58	2.3264	13 30 9.8	11.504
21	22 36 32.97	2.3202	13 18 37.5	11.572
22	22 38 52.00	2.3142	13 7 1.1	11.639
23	22 41 10.67	2.3081	S.12 55 20.8	11.704

MONDAY 12.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	22 43 28.97	2.3020	S.12 43 36.6	11.767
1	22 45 46.91	2.2960	12 31 48.7	11.828
2	22 48 4.49	2.2900	12 19 57.2	11.888
3	22 50 21.71	2.2841	12 8 2.2	11.946
4	22 52 38.58	2.2782	11 56 3.7	12.002
5	22 54 55.09	2.2723	11 44 1.9	12.057
6	22 57 11.25	2.2664	11 31 56.9	12.110
7	22 59 27.06	2.2606	11 19 48.7	12.162
8	23 1 42.53	2.2549	11 7 37.5	12.212
9	23 3 57.65	2.2491	10 55 23.3	12.260
10	23 6 12.42	2.2434	10 43 6.3	12.307
11	23 8 26.86	2.2378	10 30 46.5	12.353
12	23 10 40.96	2.2322	10 18 24.0	12.397
13	23 12 54.72	2.2266	10 5 58.9	12.438
14	23 15 8.15	2.2211	9 53 31.4	12.478
15	23 17 21.26	2.2157	9 41 1.5	12.518
16	23 19 34.04	2.2103	9 28 29.3	12.556
17	23 21 46.50	2.2049	9 15 54.8	12.592
18	23 23 58.63	2.1996	9 3 18.2	12.627
19	23 26 10.45	2.1943	8 50 39.6	12.660
20	23 28 21.95	2.1891	8 37 59.0	12.692
21	23 30 33.14	2.1839	8 25 16.6	12.721
22	23 32 44.02	2.1788	8 12 32.5	12.750
23	23 34 54.60	2.1738	7 59 46.6	12.778
24	23 37 4.88	2.1688	S. 7 46 59.1	12.804

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	TUESDAY 13.					**THURSDAY 15.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	23 37 4.88	2.1688	S. 7 46 59.1	12.804	0	1 16 34.98	2.0014	N. 2 33 40.4	12.631
1	23 39 14.86	2.1639	7 34 10.1	12.828	1	1 18 35.01	1.9995	2 46 17.4	12.602
2	23 41 24.55	2.1590	7 21 19.7	12.852	2	1 20 34.92	1.9976	2 58 52.7	12.573
3	23 43 33.94	2.1542	7 8 27.9	12.873	3	1 22 34.72	1.9957	3 11 26.2	12.542
4	23 45 43.05	2.1494	6 55 34.9	12.893	4	1 24 34.41	1.9940	3 23 57.8	12.511
5	23 47 51.87	2.1447	6 42 40.7	12.913	5	1 26 34.00	1.9923	3 36 27.5	12.479
6	23 50 0.41	2.1400	6 29 45.3	12.932	6	1 28 33.49	1.9907	3 48 55.3	12.447
7	23 52 8.67	2.1354	6 16 48.9	12.948	7	1 30 32.89	1.9891	4 1 21.1	12.413
8	23 54 16.66	2.1309	6 3 51.6	12.963	8	1 32 32.19	1.9876	4 13 44.9	12.379
9	23 56 24.38	2.1265	5 50 53.4	12.977	9	1 34 31.40	1.9862	4 26 6.6	12.344
10	23 58 31.84	2.1221	5 37 54.4	12.989	10	1 36 30.53	1.9848	4 38 26.2	12.309
11	0 0 39.03	2.1177	5 24 54.7	13.000	11	1 38 29.58	1.9835	4 50 43.7	12.273
12	0 2 45.96	2.1134	5 11 54.4	13.010	12	1 40 28.55	1.9823	5 2 59.0	12.236
13	0 4 52.64	2.1092	4 58 53.5	13.019	13	1 42 27.45	1.9811	5 15 12.0	12.197
14	0 6 59.07	2.1050	4 45 52.1	13.027	14	1 44 26.28	1.9799	5 27 22.6	12.157
15	0 9 5.24	2.1008	4 32 50.3	13.033	15	1 46 25.04	1.9787	5 39 30.9	12.118
16	0 11 11.17	2.0968	4 19 48.2	13.038	16	1 48 23.73	1.9777	5 51 36.8	12.078
17	0 13 16.86	2.0929	4 6 45.8	13.042	17	1 50 22.37	1.9768	6 3 40.3	12.037
18	0 15 22.32	2.0890	3 53 43.2	13.044	18	1 52 20.95	1.9759	6 15 41.3	11.995
19	0 17 27.54	2.0851	3 40 40.5	13.046	19	1 54 19.47	1.9750	6 27 39.7	11.953
20	0 19 32.53	2.0813	3 27 37.7	13.047	20	1 56 17.95	1.9742	6 39 35.6	11.910
21	0 21 37.30	2.0776	3 14 34.9	13.046	21	1 58 16.38	1.9735	6 51 28.9	11.866
22	0 23 41.85	2.0740	3 1 32.2	13.044	22	2 0 14.77	1.9728	7 3 19.5	11.821
23	0 25 46.18	2.0703	S. 2 48 29.7	13.041	23	2 2 13.12	1.9722	N. 7 15 7.4	11.776
	WEDNESDAY 14.					**FRIDAY 16.**			
0	0 27 50.29	2.0667	S. 2 35 27.3	13.037	0	2 4 11.43	1.9716	N. 7 26 52.6	11.730
1	0 29 54.19	2.0633	2 22 25.2	13.032	1	2 6 9.71	1.9711	7 38 35.0	11.683
2	0 31 57.89	2.0600	2 9 23.5	13.025	2	2 8 7.96	1.9706	7 50 14.6	11.636
3	0 34 1.39	2.0567	1 56 22.2	13.017	3	2 10 6.18	1.9702	8 1 51.3	11.588
4	0 36 4.69	2.0534	1 43 21.4	13.009	4	2 12 4.38	1.9698	8 13 25.2	11.540
5	0 38 7.80	2.0501	1 30 21.1	12.999	5	2 14 2.56	1.9695	8 24 56.1	11.490
6	0 40 10.71	2.0469	1 17 21.5	12.988	6	2 16 0.72	1.9693	8 36 24.0	11.440
7	0 42 13.43	2.0439	1 4 22.5	12.977	7	2 17 58.87	1.9691	8 47 48.9	11.389
8	0 44 15.98	2.0410	0 51 24.2	12.964	8	2 19 57.01	1.9689	8 59 10.7	11.338
9	0 43 18.35	2.0380	0 38 26.8	12.950	9	2 21 55.14	1.9688	9 10 29.5	11.286
10	0 48 20.54	2.0351	0 25 30.2	12.936	10	2 23 53.27	1.9687	9 21 45.1	11.233
11	0 50 22.56	2.0322	S. 0 12 34.5	12.921	11	2 25 51.39	1.9687	9 32 57.5	11.180
12	0 52 24.41	2.0295	N. 0 0 20.3	12.905	12	2 27 49.51	1.9688	9 44 6.7	11.126
13	0 54 26.10	2.0268	0 13 14.1	12.887	13	2 29 47.64	1.9689	9 55 12.6	11.072
14	0 56 27.63	2.0242	0 26 6.7	12.867	14	2 31 45.78	1.9691	10 6 15.3	11.017
15	0 58 29.00	2.0216	0 38 58.1	12.847	15	2 33 43.93	1.9693	10 17 14.7	10.961
16	1 0 30.22	2.0191	0 51 48.3	12.827	16	2 35 42.09	1.9695	10 28 10.7	10.905
17	1 2 31.29	2.0167	1 4 37.3	12.806	17	2 37 40.27	1.9698	10 39 3.3	10.849
18	1 4 32.22	2.0143	1 17 25.0	12.783	18	2 39 38.47	1.9702	10 49 52.6	10.792
19	1 6 33.01	2.0120	1 30 11.3	12.760	19	2 41 36.69	1.9706	11 0 38.4	10.733
20	1 8 33.66	2.0097	1 42 56.2	12.736	20	2 43 34.94	1.9710	11 11 20.6	10.674
21	1 10 34.18	2.0076	1 55 39.6	12.710	21	2 45 33.21	1.9714	11 21 59.3	10.615
22	1 12 34.57	2.0055	2 8 21.4	12.684	22	2 47 31.51	1.9719	11 32 34.4	10.555
23	1 14 34.84	2.0034	2 21 1.7	12.658	23	2 49 29.84	1.9725	11 43 5.9	10.495
24	1 16 34.98	2.0014	N. 2 33 40.4	12.631	24	2 51 28.21	1.9732	N. 11 53 33.8	10.434

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	SATURDAY 17.					MONDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	2 51 28.21	1.9732	N.11 53 33.8	10.434	0	4 27 34.65	2.0420	N.18 53 39.0	6.868
1	2 53 26.62	1.9738	12 3 58.0	10.372	1	4 29 37.23	2.0440	19 0 28.5	6.781
2	2 55 25.07	1.9745	12 14 18.5	10.310	2	4 31 39.93	2.0459	19 7 12.8	6.694
3	2 57 23.56	1.9753	12 24 35.2	10.247	3	4 33 42.74	2.0478	19 13 51.8	6.607
4	2 59 22.10	1.9761	12 34 48.2	10.184	4	4 35 45.67	2.0498	19 20 25.6	6.519
5	3 1 20.69	1.9769	12 44 57.3	10.120	5	4 37 48.72	2.0519	19 26 54.1	6.430
6	3 3 19.32	1.9777	12 55 2.6	10.056	6	4 39 51.90	2.0540	19 33 17.2	6.341
7	3 5 18.01	1.9787	13 5 4.0	9.991	7	4 41 55.20	2.0559	19 39 35.0	6.252
8	3 7 16.76	1.9796	13 15 1.5	9.925	8	4 43 58.61	2.0578	19 45 47.4	6.162
9	3 9 15.56	1.9805	13 24 55.0	9.859	9	4 46 2.14	2.0598	19 51 54.4	6.071
10	3 11 14.42	1.9816	13 34 44.6	9.792	10	4 48 5.79	2.0619	19 57 55.9	5.980
11	3 13 13.35	1.9827	13 44 30.1	9.725	11	4 50 9.57	2.0639	20 3 52.0	5.889
12	3 15 12.35	1.9838	13 54 11.6	9.657	12	4 52 13.46	2.0658	20 9 42.6	5.797
13	3 17 11.41	1.9849	14 3 49.0	9.589	13	4 54 17.47	2.0679	20 15 27.7	5.705
14	3 19 10.54	1.9861	14 13 22.3	9.520	14	4 56 21.61	2.0700	20 21 7.2	5.612
15	3 21 9.74	1.9873	14 22 51.4	9.451	15	4 58 25.87	2.0720	20 26 41.1	5.518
16	3 23 9.01	1.9885	14 32 16.4	9.381	16	5 0 30.25	2.0740	20 32 9.4	5.425
17	3 25 8.36	1.9897	14 41 37.1	9.310	17	5 2 34.75	2.0759	20 37 32.1	5.332
18	3 27 7.78	1.9910	14 50 53.6	9.239	18	5 4 39.36	2.0779	20 42 49.2	5.237
19	3 29 7.28	1.9923	15 0 5.8	9.168	19	5 6 44.10	2.0800	20 48 0.6	5.142
20	3 31 6.86	1.9937	15 9 13.7	9.096	20	5 8 48.96	2.0819	20 53 6.3	5.047
21	3 33 6.53	1.9952	15 18 17.3	9.023	21	5 10 53.93	2.0838	20 58 6.2	4.951
22	3 35 6.28	1.9966	15 27 16.5	8.950	22	5 12 59.02	2.0858	21 3 0.4	4.855
23	3 37 6.12	1.9981	N.15 36 11.3	8.877	23	5 15 4.23	2.0877	N.21 7 48.8	4.758
	SUNDAY 18.					TUESDAY 20.			
0	3 39 6.05	1.9996	N.15 45 1.7	8.802	0	5 17 9.55	2.0897	N.21 12 31.4	4.661
1	3 41 6.07	2.0011	15 53 47.6	8.727	1	5 19 14.99	2.0917	21 17 8.2	4.564
2	3 43 6.18	2.0026	16 2 29.0	8.652	2	5 21 20.55	2.0936	21 21 39.1	4.467
3	3 45 6.38	2.0042	16 11 5.8	8.576	3	5 23 26.22	2.0954	21 26 4.2	4.369
4	3 47 6.68	2.0058	16 19 38.1	8.500	4	5 25 32.00	2.0973	21 30 23.4	4.270
5	3 49 7.08	2.0074	16 28 5.8	8.423	5	5 27 37.90	2.0992	21 34 36.6	4.171
6	3 51 7.57	2.0090	16 36 28.9	8.346	6	5 29 43.91	2.1011	21 38 43.9	4.072
7	3 53 8.16	2.0107	16 44 47.3	8.268	7	5 31 50.03	2.1029	21 42 45.2	3.972
8	3 55 8.86	2.0125	16 53 1.0	8.190	8	5 33 56.26	2.1047	21 46 40.5	3.872
9	3 57 9.66	2.0142	17 1 10.1	8.112	9	5 36 2.60	2.1066	21 50 29.9	3.772
10	3 59 10.56	2.0159	17 9 14.4	8.032	10	5 38 9.05	2.1084	21 54 13.2	3.672
11	4 1 11.56	2.0176	17 17 13.9	7.951	11	5 40 15.61	2.1101	21 57 50.5	3.571
12	4 3 12.67	2.0194	17 25 8.5	7.870	12	5 42 22.27	2.1118	22 1 21.7	3.469
13	4 5 13.89	2.0212	17 32 58.3	7.790	13	5 44 29.03	2.1136	22 4 46.8	3.367
14	4 7 15.22	2.0230	17 40 43.3	7.709	14	5 46 35.90	2.1153	22 8 5.8	3.265
15	4 9 16.65	2.0248	17 48 23.4	7.627	15	5 48 42.87	2.1170	22 11 18.6	3.162
16	4 11 18.19	2.0267	17 55 58.6	7.545	16	5 50 49.94	2.1187	22 14 25.2	3.059
17	4 13 19.85	2.0286	18 3 28.8	7.462	17	5 52 57.11	2.1203	22 17 25.7	2.956
18	4 15 21.62	2.0304	18 10 54.0	7.378	18	5 55 4.37	2.1218	22 20 20.0	2.853
19	4 17 23.50	2.0323	18 18 14.2	7.295	19	5 57 11.73	2.1234	22 23 8.1	2.749
20	4 19 25.50	2.0342	18 25 29.4	7.211	20	5 59 19.18	2.1250	22 25 49.9	2.645
21	4 21 27.61	2.0362	18 32 39.5	7.126	21	6 1 26.73	2.1266	22 28 25.5	2.541
22	4 23 29.84	2.0382	18 39 44.5	7.040	22	6 3 34.37	2.1281	22 30 54.8	2.436
23	4 25 32.19	2.0401	18 46 44.3	6.954	23	6 5 42.10	2.1295	22 33 17.8	2.332
24	4 27 34.65	2.0420	N.18 53 39.0	6.868	24	6 7 49.91	2.1309	N.22 35 34.6	2.227

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	WEDNESDAY 21.					**FRIDAY 23.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	6 7 49.91	2.1309	N.22 35 34.6	2.227	0	7 51 6.31	2.1570	N.22 17 50.6	2.994
1	6 9 57.81	2.1323	22 37 45.0	2.121	1	7 53 15.72	2.1566	22 14 47.7	3.102
2	6 12 5.79	2.1337	22 39 49.1	2.015	2	7 55 25.10	2.1561	22 11 38.3	3.211
3	6 14 13.86	2.1351	22 41 46.8	1.909	3	7 57 34.45	2.1555	22 8 22.4	3.319
4	6 16 22.01	2.1364	22 43 38.1	1.803	4	7 59 43.76	2.1549	22 5 0.0	3.427
5	6 18 30.23	2.1377	22 45 23.1	1.697	5	8 1 53.04	2.1544	22 1 31.1	3.535
6	6 20 38.53	2.1389	22 47 1.7	1.590	6	8 4 2.29	2.1538	21 57 55.8	3.643
7	6 22 46.90	2.1402	22 48 33.9	1.482	7	8 6 11.50	2.1531	21 54 14.0	3.751
8	6 24 55.35	2.1414	22 49 59.6	1.375	8	8 8 20.66	2.1524	21 50 25.7	3.858
9	6 27 3.87	2.1425	22 51 18.9	1.268	9	8 10 29.78	2.1517	21 46 31.0	3.965
10	6 29 12.45	2.1436	22 52 31.8	1.161	10	8 12 38.86	2.1509	21 42 29.9	4.072
11	6 31 21.10	2.1447	22 53 38.2	1.053	11	8 14 47.89	2.1501	21 38 22.4	4.178
12	6 33 29.82	2.1458	22 54 38.2	0.946	12	8 16 56.87	2.1492	21 34 8.5	4.285
13	6 35 38.60	2.1468	22 55 31.7	0.837	13	8 19 5.80	2.1483	21 29 48.2	4.391
14	6 37 47.44	2.1477	22 56 18.7	0.729	14	8 21 14.67	2.1474	21 25 21.6	4.496
15	6 39 56.33	2.1487	22 56 59.2	0.620	15	8 23 23.49	2.1465	21 20 48.7	4.602
16	6 42 5.28	2.1496	22 57 33.1	0.511	16	8 25 32.25	2.1455	21 16 9.4	4.707
17	6 44 14.28	2.1504	22 58 0.5	0.402	17	8 27 40.95	2.1445	21 11 23.8	4.812
18	6 46 23.33	2.1513	22 58 21.4	0.293	18	8 29 49.59	2.1434	21 6 32.0	4.916
19	6 48 32.43	2.1521	22 58 35.7	0.184	19	8 31 58.16	2.1423	21 1 33.9	5.021
20	6 50 41.58	2.1528	22 58 43.5	+ 0.076	20	8 34 6.67	2.1413	20 56 29.5	5.125
21	6 52 50.77	2.1535	22 58 44.8	− 0.033	21	8 36 15.12	2.1402	20 51 18.9	5.228
22	6 55 0.00	2.1542	22 58 39.5	0.143	22	8 38 23.50	2.1390	20 46 2.2	5.330
23	6 57 9.27	2.1548	N.22 58 27.6	0.252	23	8 40 31.80	2.1378	N.20 40 39.3	5 433
	THURSDAY 22.					**SATURDAY 24.**			
0	6 59 18.57	2.1553	N.22 58 9.2	0.362	0	8 42 40.03	2.1366	N.20 35 10.2	5.536
1	7 1 27.91	2.1559	22 57 44.2	0.472	1	8 44 48.19	2.1353	20 29 35.0	5.638
2	7 3 37.28	2.1564	22 57 12.6	0.582	2	8 46 56.27	2.1341	20 23 53.7	5.739
3	7 5 46.68	2.1568	22 56 34.4	0.692	3	8 49 4.28	2.1328	20 18 6.3	5.841
4	7 7 56.10	2.1573	22 55 49.6	0.802	4	8 51 12.21	2.1315	20 12 12.8	5.942
5	7 10 5.55	2.1577	22 54 58.2	0.911	5	8 53 20.06	2.1301	20 6 13.3	6.042
6	7 12 15.02	2.1580	22 54 0.3	1.020	6	8 55 27.82	2.1287	20 0 7.8	6.142
7	7 14 24.51	2.1582	22 52 55.8	1.130	7	8 57 35.50	2.1273	19 53 56.3	6.241
8	7 16 34.01	2.1585	22 51 44.7	1.241	8	8 59 43.10	2.1260	19 47 38.9	6.340
9	7 18 43.53	2.1587	22 50 26.9	1.351	9	9 1 50.62	2.1246	19 41 15.5	6.439
10	7 20 53.06	2.1589	22 49 2.5	1.461	10	9 3 58.05	2.1231	19 34 46.2	6.537
11	7 23 2.60	2.1591	22 47 31.6	1.570	11	9 6 5.39	2.1217	19 28 11.1	0.634
12	7 25 12.15	2.1592	22 45 54.1	1.680	12	9 8 12.65	2.1202	19 21 30.1	6.731
13	7 27 21.70	2.1592	22 44 10.0	1.790	13	9 10 19.82	2.1187	19 14 43.3	6.828
14	7 29 31.25	2.1592	22 42 19.3	1.900	14	9 12 26.89	2.1171	19 7 50.7	6.924
15	7 31 40.80	2.1592	22 40 22.0	2.010	15	9 14 33.87	2.1156	19 0 52.4	7.020
16	7 33 50.35	2.1591	22 38 18.1	2.120	16	9 16 40.76	2.1141	18 53 48.3	7.115
17	7 35 59.89	2.1589	22 36 7.6	2.229	17	9 18 47.56	2.1125	18 46 38.6	7.209
18	7 38 9.42	2.1587	22 33 50.6	2.338	18	9 20 54.26	2.1109	18 39 23.2	7.303
19	7 40 18.94	2.1586	22 31 27.0	2.448	19	9 23 0.87	2.1093	18 32 2.2	7.397
20	7 42 28.45	2.1584	22 28 56.8	2.557	20	9 25 7.38	2.1078	18 24 35.6	7.490
21	7 44 37.95	2.1582	22 26 20.1	2.667	21	9 27 13.80	2.1062	18 17 3.4	7.582
22	7 46 47.43	2.1578	22 23 36.8	2.776	22	9 29 20.12	2.1045	18 9 25.7	7.674
23	7 48 56.88	2.1574	22 20 47.0	2.885	23	9 31 26.34	2.1028	18 1 42.5	7.766
24	7 51 6.31	2.1570	N.22 17 50.6	2.994	24	9 33 32.46	2.1012	N.17 53 53.8	7.857

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	SUNDAY 25.					**TUESDAY 27.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	9 33 32.46	2.1012	N.17 53 53.8	7.857	0	11 12 35.36	2.0312	N.10 5 2.5	11.394
1	9 35 38.48	2.0996	17 45 59.7	7.947	1	11 14 37.20	2.0302	9 53 37.2	11.449
2	9 37 44.41	2.0980	17 38 0.2	8.036	2	11 16 38.99	2.0293	9 42 8.6	11.503
3	9 39 50.24	2.0963	17 29 55.4	8.124	3	11 18 40.72	2.0284	9 30 36.8	11.556
4	9 41 55.97	2.0947	17 21 45.3	8.213	4	11 20 42.40	2.0276	9 19 1.8	11.608
5	9 44 1.60	2.0930	17 13 29.9	8.301	5	11 22 44.03	2.0268	9 7 23.8	11.658
6	9 46 7.13	2.0913	17 5 9.2	8.388	6	11 24 45.61	2.0260	8 55 42.8	11.708
7	9 48 12.56	2.0897	16 56 43.3	8.474	7	11 26 47.15	2.0252	8 43 58.8	11.758
8	9 50 17.89	2.0881	16 48 12.3	8.559	8	11 28 48.64	2.0245	8 32 11.8	11.807
9	9 52 23.13	2.0864	16 39 36.2	8.644	9	11 30 50.09	2.0239	8 20 21.9	11.855
10	9 54 28.26	2.0847	16 30 55.0	8.729	10	11 32 51.51	2.0233	8 8 29.2	11.901
11	9 56 33.29	2.0831	16 22 8.7	8.813	11	11 34 52.89	2.0227	7 56 33.8	11.946
12	9 58 38.23	2.0814	16 13 17.4	8.897	12	11 36 54.23	2.0221	7 44 35.7	11.991
13	10 0 43.06	2.0798	16 4 21.1	8.979	13	11 38 55.54	2.0216	7 32 34.9	12.035
14	10 2 47.80	2.0782	15 55 19.9	9.060	14	11 40 56.82	2.0212	7 20 31.5	12.078
15	10 4 52.44	2.0765	15 46 13.9	9.140	15	11 42 58.08	2.0208	7 8 25.5	12.121
16	10 6 56.98	2.0748	15 37 3.1	9.221	16	11 44 59.32	2.0204	6 56 17.0	12.162
17	10 9 1.42	2.0732	15 27 47.4	9.302	17	11 47 0.53	2.0200	6 44 6.1	12.202
18	10 11 5.77	2.0716	15 18 26.9	9.381	18	11 49 1.72	2.0197	6 31 52.8	12.241
19	10 13 10.02	2.0700	15 9 1.7	9.459	19	11 51 2.90	2.0195	6 19 37.2	12.279
20	10 15 14.17	2.0684	14 59 31.9	9.536	20	11 53 4.06	2.0193	6 7 19.3	12.317
21	10 17 18.23	2.0668	14 49 57.4	9.613	21	11 55 5.21	2.0191	5 54 59.1	12.355
22	10 19 22.19	2.0652	14 40 18.3	9.689	22	11 57 6.35	2.0190	5 42 36.7	12.390
23	10 21 26.06	2.0637	N.14 30 34.7	9.764	23	11 59 7.49	2.0190	N. 5 30 12.3	12.424
	MONDAY 26.					**WEDNESDAY 28.**			
0	10 23 29.83	2.0621	N.14 20 46.6	9.839	0	12 1 8.63	2.0190	N. 5 17 45.9	12.457
1	10 25 33.51	2.0606	14 10 54.0	9.913	1	12 3 9.77	2.0190	5 5 17.5	12.490
2	10 27 37.10	2.0591	14 0 57.0	9.986	2	12 5 10.91	2.0190	4 52 47.1	12.522
3	10 29 40.60	2.0576	13 50 55.7	10.058	3	12 7 12.05	2.0191	4 40 14.8	12.553
4	10 31 44.01	2.0561	13 40 50.1	10.129	4	12 9 13.20	2.0192	4 27 40.7	12.583
5	10 33 47.33	2.0547	13 30 40.2	10.201	5	12 11 14.36	2.0195	4 15 4.8	12.612
6	10 35 50.57	2.0532	13 20 26.0	10.271	6	12 13 15.54	2.0198	4 2 27.2	12.641
7	10 37 53.72	2.0517	13 10 7.7	10.340	7	12 15 16.74	2.0201	3 49 47.9	12.668
8	10 39 56.78	2.0503	12 59 45.2	10.409	8	12 17 17.96	2.0204	3 37 7.1	12.693
9	10 41 59.76	2.0490	12 49 18.6	10.477	9	12 19 19.19	2.0208	3 24 24.8	12.718
10	10 44 2.66	2.0476	12 38 48.0	10.543	10	12 21 20.45	2.0213	3 11 41.0	12.743
11	10 46 5.48	2.0462	12 28 13.4	10.609	11	12 23 21.75	2.0219	2 58 55.7	12.766
12	10 48 8.21	2.0448	12 17 34.9	10.674	12	12 25 23.08	2.0225	2 46 9.1	12.788
13	10 50 10.86	2.0436	12 6 52.5	10.739	13	12 27 24.45	2.0231	2 33 21.2	12.809
14	10 52 13.44	2.0424	11 56 6.2	10.803	14	12 29 25.85	2.0237	2 20 32.0	12.829
15	10 54 15.95	2.0412	11 45 16.1	10.866	15	12 31 27.29	2.0244	2 7 41.7	12.848
16	10 56 18.38	2.0399	11 34 22.3	10.928	16	12 33 28.77	2.0252	1 54 50.3	12.866
17	10 58 20.74	2.0387	11 23 24.7	10.990	17	12 35 30.31	2.0261	1 41 57.8	12.883
18	11 0 23.02	2.0375	11 12 23.5	11.050	18	12 37 31.90	2.0270	1 29 4.3	12.900
19	11 2 25.24	2.0364	11 1 18.7	11.110	19	12 39 33.55	2.0279	1 16 9.8	12.915
20	11 4 27.39	2.0353	10 50 10.3	11.168	20	12 41 35.25	2.0288	1 3 14.5	12.928
21	11 6 29.48	2.0342	10 38 58.5	11.226	21	12 43 37.01	2.0299	0 50 18.4	12.941
22	11 8 31.50	2.0332	10 27 43.2	11.283	22	12 45 38.84	2.0310	0 37 21.6	12.953
23	11 10 33.46	2.0322	10 16 24.5	11.339	23	12 47 40.73	2.0321	0 24 24.0	12.965
24	11 12 35.36	2.0312	N.10 5 2.5	11.394	24	12 49 42.69	2.0333	N. 0 11 25.8	12.975

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

THURSDAY 29.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	12 49 42.69	2.0333	N. 0 11 25.8	12.975
1	12 51 44.72	2.0346	S. 0 1 33.0	12.984
2	12 53 46.84	2.0360	0 14 32.3	12.992
3	12 55 49.04	2.0373	0 27 32.0	12.998
4	12 57 51.32	2.0387	0 40 32.1	13.004
5	12 59 53.69	2.0403	0 53 32.5	13.009
6	13 1 56.16	2.0419	1 6 33.2	13.013
7	13 3 58.72	2.0435	1 19 34.1	13.016
8	13 6 1.38	2.0451	1 32 35.1	13.017
9	13 8 4.13	2.0468	1 45 36.2	13.018
10	13 10 6.99	2.0486	1 58 37.3	13.017
11	13 12 9.96	2.0504	2 11 38.3	13.015
12	13 14 13.04	2.0522	2 24 39.1	13.012
13	13 16 16.23	2.0542	2 37 39.8	13.009
14	13 18 19.55	2.0563	2 50 40.2	13.004
15	13 20 22.99	2.0584	3 3 40.3	12.998
16	13 22 26.55	2.0605	3 16 40.0	12.991
17	13 24 30.25	2.0627	3 29 39.2	12.982
18	13 26 34.08	2.0649	3 42 37.9	12.973
19	13 28 38.04	2.0672	3 55 36.0	12.963
20	13 30 42.14	2.0696	4 8 33.5	12.952
21	13 32 46.39	2.0721	4 21 30.3	12.940
22	13 34 50.79	2.0745	4 34 26.3	12.926
23	13 36 55.33	2.0769	S. 4 47 21.4	12.911

FRIDAY 30.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	13 39 0.02	2.0795	S. 5 0 15.6	12.895
1	13 41 4.87	2.0822	5 13 8.8	12.878
2	13 43 9.88	2.0849	5 26 1.0	12.860
3	13 45 15.06	2.0877	5 38 52.0	12.840
4	13 47 20.41	2.0906	5 51 41.8	12.819
5	13 49 25.93	2.0934	6 4 30.3	12.797
6	13 51 31.62	2.0963	6 17 17.5	12.775
7	13 53 37.49	2.0993	6 30 3.3	12.751
8	13 55 43.54	2.1024	6 42 47.6	12.726
9	13 57 49.78	2.1056	6 55 30.4	12.700
10	13 59 56.21	2.1087	7 8 11.6	12.672
11	14 2 2.83	2.1119	7 20 51.0	12.643
12	14 4 9.64	2.1152	7 33 28.7	12.613
13	14 6 16.65	2.1185	7 46 4.6	12.582
14	14 8 23.86	2.1219	7 58 38.6	12.550
15	14 10 31.28	2.1254	8 11 10.6	12.516
16	14 12 38.91	2.1289	8 23 40.5	12.482
17	14 14 46.75	2.1324	8 36 8.4	12.447
18	14 16 54.80	2.1360	8 48 34.1	12.409
19	14 19 3.07	2.1397	9 0 57.5	12.371
20	14 21 11.56	2.1434	9 13 18.6	12.332
21	14 23 20.28	2.1472	9 25 37.3	12.291
22	14 25 29.22	2.1510	9 37 53.5	12.248
23	14 27 38.40	2.1549	9 50 7.1	12.205
24	14 29 47.81	2.1588	S. 10 2 18.1	12.161

SATURDAY 31.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	14 29 47.81	2.1588	S. 10 2 18.1	12.161
1	14 31 57.46	2.1628	10 14 26.4	12.115
2	14 34 7.35	2.1668	10 26 31.9	12.068
3	14 36 17.48	2.1709	10 38 34.6	12.020
4	14 38 27.86	2.1751	10 50 34.3	11.970
5	14 40 38.49	2.1792	11 2 31.0	11.919
6	14 42 49.36	2.1834	11 14 24.6	11.867
7	14 45 0.49	2.1877	11 26 15.1	11.814
8	14 47 11.88	2.1921	11 38 2.3	11.759
9	14 49 23.54	2.1965	11 49 46.2	11.703
10	14 51 35.46	2.2009	12 1 26.7	11.646
11	14 53 47.64	2.2053	12 13 3.7	11.587
12	14 56 0.09	2.2098	12 24 37.2	11.528
13	14 58 12.81	2.2143	12 36 7.1	11.467
14	15 0 25.81	2.2189	12 47 33.2	11.404
15	15 2 39.08	2.2235	12 58 55.6	11.341
16	15 4 52.63	2.2281	13 10 14.2	11.277
17	15 7 6.46	2.2328	13 21 28.8	11.210
18	15 9 20.57	2.2376	13 32 39.4	11.142
19	15 11 34.97	2.2424	13 43 45.9	11.074
20	15 13 49.66	2.2471	13 54 48.3	11.004
21	15 16 4.63	2.2519	14 5 46.4	10.932
22	15 18 19.89	2.2568	14 16 40.1	10.859
23	15 20 35.45	2.2618	S. 14 27 29.5	10.786

SUNDAY, SEPTEMBER 1.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	15 22 51.31	2.2668	S. 14 38 14.4	10.710

PHASES OF THE MOON.

		d	h	m
☽ First Quarter . . . Aug.		4	1	26.9
○ Full Moon		10	16	42.7
☾ Last Quarter		17	22	51.6
● New Moon		26	2	0.0

	d	h
☾ Perigee . . . . Aug.	8	19.4
☾ Apogee	20	18.5

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Sun	W.	52° 7′ 11″	3016	53° 37′ 4″	3005	55° 7′ 11″	2993	56° 37′ 32″	2983
	Antares	E.	67 32 4	2721	65 55 52	2713	64 19 29	2704	62 42 54	2695
	Jupiter	E.	87 59 57	2655	86 22 17	2645	84 44 23	2635	83 6 16	2625
2	Sun	W.	64 12 49	2924	65 44 37	2912	67 16 40	2901	68 48 58	2888
	Antares	E.	54 36 58	2650	52 59 11	2642	51 21 13	2634	49 43 4	2625
	Jupiter	E.	74 52 9	2572	73 12 36	2561	71 32 48	2551	69 52 45	2540
	α Aquilæ	E.	101 4 3	3282	99 39 30	3265	98 14 37	3247	96 49 24	3231
3	Sun	W.	76 34 28	2826	78 8 22	2813	79 42 33	2800	81 17 1	2787
	Antares	E.	41 29 36	2589	39 50 26	2584	38 11 9	2579	36 31 45	2575
	Jupiter	E.	61 28 36	2482	59 46 58	2470	58 5 3	2458	56 22 51	2447
	α Aquilæ	E.	89 38 54	3164	88 12 2	3154	86 44 58	3144	85 17 42	3135
4	Sun	W.	89 13 37	2722	90 49 48	2708	92 26 17	2695	94 3 3	2682
	Spica	W.	20 15 1	2687	21 51 58	2634	23 30 7	2590	25 9 16	2553
	Jupiter	E.	47 47 41	2387	46 3 48	2375	44 19 37	2363	42 35 9	2350
	α Aquilæ	E.	77 59 7	3107	76 31 6	3105	75 3 3	3105	73 34 59	3105
5	Sun	W.	102 11 17	2618	103 49 48	2605	105 28 36	2593	107 7 41	2580
	Spica	W.	33 36 15	2416	35 19 27	2395	37 3 9	2375	38 47 19	2357
	Jupiter	E.	33 48 28	2291	32 2 16	2281	30 15 48	2269	28 29 3	2258
	α Aquilæ	E.	66 15 35	3136	64 48 9	3148	63 20 58	3164	61 54 6	3182
	Fomalhaut	E.	97 47 32	2506	96 6 27	2492	94 25 3	2480	92 43 21	2467
6	Sun	W.	115 27 16	2522	117 7 59	2511	118 48 57	2500	120 30 10	2490
	Spica	W.	47 34 24	2278	49 20 56	2264	51 7 49	2251	52 55 1	2239
	α Aquilæ	E.	54 46 31	3328	53 22 52	3372	52 0 3	3421	50 38 10	3478
	Fomalhaut	E.	84 10 48	2415	82 27 34	2405	80 44 7	2398	79 0 29	2390
	α Pegasi	E.	100 38 46	2633	99 0 36	2618	97 22 6	2604	95 43 17	2592
7	Sun	W.	128 59 39	2445	130 42 10	2437	132 24 52	2430	134 7 44	2423
	Spica	W.	61 55 21	2184	63 44 12	2175	65 33 17	2167	67 22 35	2159
	α Aquilæ	E.	44 7 20	3896	42 53 56	4018	41 42 34	4157	40 33 27	4315
	Fomalhaut	E.	70 20 2	2366	68 35 38	2364	66 51 11	2362	65 6 42	2363
	α Pegasi	E.	87 25 26	2546	85 45 17	2540	84 4 59	2535	82 24 35	2532
8	Spica	W.	76 31 47	2128	78 22 4	2124	80 12 27	2120	82 2 56	2116
	Antares	W.	30 56 2	2227	32 43 50	2209	34 32 4	2195	36 20 39	2183
	Fomalhaut	E.	56 25 5	2386	54 41 10	2396	52 57 29	2408	51 14 6	2423
	α Pegasi	E.	74 2 1	2535	72 21 37	2541	70 41 21	2548	69 1 14	2557
9	Spica	W.	91 16 13	2111	93 6 55	2112	94 57 36	2114	96 48 14	2116
	Antares	W.	45 27 15	2147	47 17 2	2144	49 6 54	2141	50 56 50	2141
	Jupiter	W.	24 48 35	2067	26 40 25	2068	28 32 14	2069	30 24 1	2071
	Fomalhaut	E.	42 43 45	2543	41 3 32	2581	39 24 11	2624	37 45 48	2673
	α Pegasi	E.	60 44 41	2634	59 6 32	2656	57 28 53	2682	55 51 49	2711
10	Antares	W.	60 6 24	2149	61 56 8	2154	63 45 45	2159	65 35 15	2164
	Jupiter	W.	39 41 52	2090	41 33 6	2096	43 24 11	2103	45 15 6	2109
	α Arietis	E.	88 8 53	2246	86 21 34	2253	84 34 25	2260	82 47 27	2268
	Aldebaran	E.	119 23 55	2107	117 33 7	2113	115 42 28	2119	113 51 58	2126

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ′ ″		° ′ ″		° ′ ″		° ′ ″	
1	Sun	W.	58 8 6	2971	59 38 55	2960	61 9 58	2948	62 41 16	2936
	Antares	E.	61 6 7	2686	59 29 8	2676	57 51 56	2668	56 14 33	2659
	Jupiter	E.	81 27 55	2615	79 49 20	2604	78 10 31	2593	76 31 27	2583
2	Sun	W.	70 21 32	2876	71 54 22	2863	73 27 28	2851	75 0 50	2838
	Antares	E.	48 4 43	2617	46 26 11	2610	44 47 29	2602	43 8 37	2596
	Jupiter	E.	68 12 27	2528	66 31 53	2517	64 51 4	2505	63 9 58	2494
	α Aquilæ	E.	95 23 52	3216	93 58 2	3202	92 31 55	3188	91 5 32	3176
3	Sun	W.	82 51 46	2774	84 26 48	2761	86 2 7	2748	87 37 43	2735
	Antares	E.	34 52 16	2573	33 12 44	2572	31 33 11	2573	29 53 39	2577
	Jupiter	E.	54 40 23	2435	52 57 38	2423	51 14 36	2411	49 31 17	2399
	α Aquilæ	E.	83 50 15	3128	82 22 39	3121	80 54 55	3115	79 27 4	3110
4	Sun	W.	95 40 7	2669	97 17 28	2656	98 55 7	2643	100 33 3	2630
	Spica	W.	26 49 16	2520	28 30 2	2489	30 11 30	2463	31 53 35	2438
	Jupiter	E.	40 50 23	2339	39 5 20	2327	37 20 0	2315	35 34 23	2303
	α Aquilæ	E.	72 6 56	3108	70 38 56	3112	69 11 1	3118	67 43 13	3126
5	Sun	W.	108 47 3	2569	110 26 41	2556	112 6 36	2544	113 46 48	2533
	Spica	W.	40 31 55	2339	42 16 57	2323	44 2 23	2307	45 48 13	2292
	Jupiter	E.	26 42 2	2247	24 54 45	2237	23 7 12	2226	21 19 23	2216
	α Aquilæ	E.	60 27 35	3204	59 1 30	3229	57 35 55	3258	56 10 54	3290
	Fomalhaut	E.	91 1 22	2455	89 19 6	2445	87 36 35	2434	85 53 49	2424
6	Sun	W.	122 11 37	2480	123 53 18	2471	125 35 12	2462	127 17 19	2453
	Spica	W.	54 42 31	2227	56 30 19	2215	58 18 24	2204	60 6 45	2194
	α Aquilæ	E.	49 17 21	3542	47 57 43	3614	46 39 24	3696	45 22 33	3790
	Fomalhaut	E.	77 16 40	2384	75 32 42	2378	73 48 35	2373	72 4 21	2369
	α Pegasi	E.	94 4 11	2580	92 24 49	2570	90 45 13	2561	89 5 25	2553
7	Sun	W.	135 50 46	2417	137 33 56	2412	139 17 14	2407	141 0 39	2403
	Spica	W.	69 12 4	2151	71 1 45	2144	72 51 37	2138	74 41 38	2133
	α Aquilæ	E.	39 26 48	4494	38 22 51	4702	37 21 53	4941	36 24 11	5218
	Fomalhaut	E.	63 22 14	2364	61 37 48	2367	59 53 26	2372	58 9 11	2378
	α Pegasi	E.	80 44 6	2530	79 3 35	2529	77 23 2	2530	75 42 30	2532
8	Spica	W.	83 53 30	2114	85 44 8	2112	87 34 49	2111	89 25 31	2111
	Antares	W.	38 9 32	2172	39 58 41	2164	41 48 3	2157	43 37 35	2152
	Fomalhaut	E.	49 31 4	2440	47 48 26	2460	46 6 17	2485	44 24 42	2512
	α Pegasi	E.	67 21 20	2568	65 41 41	2580	64 2 19	2596	62 23 18	2613
9	Spica	W.	98 38 49	2119	100 29 19	2123	102 19 43	2128	104 10 0	2132
	Antares	W.	52 46 47	2141	54 36 44	2141	56 26 40	2143	58 16 34	2145
	Jupiter	W.	32 15 45	2073	34 7 26	2077	35 59 1	2081	37 50 30	2085
	Fomalhaut	E.	36 8 32	2731	34 32 33	2799	32 58 4	2879	31 25 18	2972
	α Pegasi	E.	54 15 24	2744	52 39 42	2781	51 4 49	2823	49 30 51	2869
10	Antares	W.	67 24 37	2170	69 13 49	2178	71 2 49	2186	72 51 37	2195
	Jupiter	W.	47 5 51	2117	48 56 24	2126	50 46 43	2135	52 36 49	2144
	α Arietis	E.	81 0 41	2278	79 14 9	2287	77 27 51	2298	75 41 49	2311
	Aldebaran	E.	112 1 39	2134	110 11 32	2142	108 21 37	2151	106 31 56	2161

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
11	Antares	W.	74° 40′ 12″	2204	76° 28′ 33″	2214	78° 16′ 39″	2225	80° 4′ 29″	2236
	Jupiter	W.	54 26 41	2154	56 16 18	2165	58 5 38	2176	59 54 41	2188
	α Aquilæ	W.	39 24 28	4367	40 30 19	4215	41 38 31	4081	42 48 51	3964
	α Arietis	E.	73 56 5	2324	72 10 40	2337	70 25 35	2352	68 40 51	2368
	Aldebaran	E.	104 42 29	2170	102 53 17	2181	101 4 21	2192	99 15 41	2204
12	Antares	W.	88 59 14	2301	90 45 12	2315	92 30 50	2330	94 16 6	2345
	Jupiter	W.	68 55 21	2253	70 42 29	2268	72 29 16	2283	74 15 41	2298
	α Aquilæ	W.	49 5 32	3567	50 24 42	3516	51 44 48	3471	53 5 44	3432
	α Arietis	E.	60 3 21	2462	58 21 14	2484	56 39 38	2507	54 58 35	2532
	Aldebaran	E.	90 16 59	2269	88 30 14	2283	86 43 50	2298	84 57 48	2313
13	Jupiter	W.	83 2 3	2378	84 46 9	2395	86 29 51	2412	88 13 8	2429
	α Aquilæ	W.	59 59 30	3311	61 23 29	3297	62 47 44	3287	64 12 11	3279
	α Arietis	E.	46 42 25	2677	45 5 14	2711	43 28 49	2748	41 53 13	2788
	Aldebaran	E.	76 13 17	2394	74 29 33	2410	72 46 13	2427	71 3 17	2445
	Venus	E.	106 17 19	2753	104 41 49	2772	103 6 44	2790	101 32 3	2809
14	Jupiter	W.	96 43 27	2517	98 24 17	2534	100 4 43	2552	101 44 44	2569
	α Aquilæ	W.	71 15 48	3273	72 40 31	3277	74 5 9	3283	75 29 40	3289
	Fomalhaut	W.	35 48 20	3133	37 15 50	3105	38 43 54	3082	40 12 25	3065
	Aldebaran	E.	62 34 48	2533	60 54 20	2551	59 14 17	2568	57 34 38	2585
	Venus	E.	93 44 47	2905	92 12 34	2924	90 40 45	2943	89 9 21	2962
	Sun	E.	136 13 26	2862	134 40 19	2881	133 7 36	2900	131 35 17	2919
15	Fomalhaut	W.	47 38 47	3029	49 8 24	3029	50 38 1	3030	52 7 37	3032
	α Pegasi	W.	35 56 41	4074	37 7 8	3987	38 19 0	3914	39 32 6	3850
	Aldebaran	E.	49 22 26	2674	47 45 11	2691	46 8 19	2708	44 31 50	2725
	Venus	E.	81 38 20	3058	80 9 19	3076	78 40 40	3095	77 12 24	3113
	Pollux	E.	93 36 20	2687	91 59 23	2704	90 22 49	2721	88 46 37	2738
	Sun	E.	123 59 29	3009	122 29 27	3027	120 59 48	3046	119 30 32	3064
16	Fomalhaut	W.	59 34 29	3058	61 3 30	3065	62 32 22	3072	64 1 6	3079
	α Pegasi	W.	45 51 29	3636	47 9 24	3609	48 27 49	3586	49 46 39	3565
	Aldebaran	E.	36 35 0	2808	35 0 43	2824	33 26 46	2840	31 53 10	2856
	Venus	E.	69 56 28	3200	68 30 19	3217	67 4 30	3234	65 39 1	3249
	Pollux	E.	80 50 58	2817	79 16 52	2832	77 43 6	2847	76 9 39	2861
	Sun	E.	112 9 29	3148	110 42 18	3164	109 15 26	3179	107 48 52	3194
17	Fomalhaut	W.	71 22 18	3121	72 50 2	3129	74 17 36	3138	75 44 59	3147
	α Pegasi	W.	56 25 24	3500	57 45 48	3493	59 6 20	3486	60 27 0	3480
	Venus	E.	58 36 3	3323	57 12 18	3337	55 48 49	3350	54 25 35	3362
	Pollux	E.	68 26 56	2930	66 55 15	2942	65 23 50	2954	63 52 40	2966
	Mars	E.	82 45 43	3138	81 18 19	3150	79 51 10	3163	78 24 16	3174
	Sun	E.	100 40 30	3266	99 15 39	3280	97 51 4	3293	96 26 44	3304
18	Fomalhaut	W.	82 59 26	3187	84 25 51	3194	85 52 7	3202	87 18 14	3209
	α Pegasi	W.	67 11 31	3465	68 32 34	3464	69 53 38	3464	71 14 42	3463
	Venus	E.	47 32 51	3419	46 10 56	3428	44 49 11	3438	43 27 37	3446
	Pollux	E.	56 20 26	3021	54 50 39	3030	53 21 4	3040	51 51 41	3049
	Mars	E.	71 13 7	3227	69 47 30	3236	68 22 3	3244	66 56 46	3253
	Sun	E.	89 28 23	3359	88 5 20	3368	86 42 27	3378	85 19 45	3386

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
11	Antares	W.	81° 52′ 3″	2947	83° 39′ 20″	2960	85° 26′ 18″	2974	87° 12′ 56″	2987
	JUPITER	W.	61 43 27	2200	63 31 55	2212	65 20 4	2226	67 7 53	2240
	α Aquilæ	W.	44 1 6	3862	45 15 4	3773	46 30 34	3695	47 47 26	3626
	α Arietis	E.	66 56 30	2385	65 12 34	2403	63 29 3	2421	61 45 58	2441
	Aldebaran	E.	97 27 19	2216	95 39 16	2229	93 51 31	2241	92 4 5	2255
12	Antares	W.	96 1 0	2361	97 45 31	2377	99 29 39	2394	101 13 23	2410
	JUPITER	W.	76 1 43	2313	77 47 23	2329	79 32 40	2346	81 17 33	2362
	α Aquilæ	W.	54 27 24	3399	55 49 42	3371	57 12 32	3346	58 35 50	3327
	α Arietis	E.	53 18 6	2558	51 38 13	2585	49 58 57	2613	48 20 20	2644
	Aldebaran	E.	83 12 8	2328	81 26 50	2344	79 41 55	2361	77 57 24	2378
13	JUPITER	W.	89 56 1	2447	91 38 29	2464	93 20 33	2482	95 2 12	2499
	α Aquilæ	W.	65 36 47	3274	67 1 29	3270	68 26 15	3270	69 51 2	3270
	α Arietis	E.	40 18 29	2830	38 44 40	2876	37 11 51	2927	35 40 6	2981
	Aldebaran	E.	69 20 46	2462	67 38 40	2480	65 56 58	2497	64 15 41	2515
	VENUS	E.	99 57 47	2828	98 23 55	2847	96 50 28	2866	95 17 25	2885
14	JUPITER	W.	103 24 21	2588	105 3 33	2605	106 42 21	2622	108 20 46	2639
	α Aquilæ	W.	76 54 4	3297	78 18 19	3306	79 42 23	3317	81 6 15	3328
	Fomalhaut	W.	41 41 17	3052	43 10 25	3043	44 39 45	3036	46 9 13	3031
	Aldebaran	E.	55 55 23	2604	54 16 33	2621	52 38 7	2639	51 0 5	2656
	VENUS	E.	87 38 21	2981	86 7 45	3001	84 37 33	3020	83 7 45	3039
	SUN	E.	130 3 22	2937	128 31 50	2954	127 0 40	2973	125 29 53	2991
15	Fomalhaut	W.	53 37 10	3035	55 6 39	3040	56 36 2	3045	58 5 19	3051
	α Pegasi	W.	40 46 17	3793	42 1 26	3746	43 17 25	3704	44 34 8	3668
	Aldebaran	E.	42 55 44	2742	41 20 0	2759	39 44 38	2775	38 9 38	2792
	VENUS	E.	75 44 30	3131	74 16 58	3148	72 49 47	3166	71 22 57	3183
	Pollux	E.	87 10 47	2754	85 35 19	2770	84 0 12	2785	82 25 25	2801
	SUN	E.	118 1 38	3081	116 33 5	3097	115 4 52	3114	113 37 0	3132
16	Fomalhaut	W.	65 29 41	3087	66 58 6	3096	68 26 20	3105	69 54 24	3113
	α Pegasi	W.	51 5 51	3548	52 25 22	3534	53 45 9	3521	55 5 10	3509
	Aldebaran	E.	30 19 55	2872	28 47 0	2887	27 14 24	2902	25 42 8	2919
	VENUS	E.	64 13 50	3265	62 48 57	3280	61 24 22	3294	60 0 4	3309
	Pollux	E.	74 36 30	2876	73 3 40	2890	71 31 8	2903	69 58 53	2917
	SUN	E.	106 22 36	3210	104 56 39	3225	103 31 0	3239	102 5 37	3253
17	Fomalhaut	W.	77 12 12	3155	78 39 15	3163	80 6 8	3171	81 32 52	3179
	α Pegasi	W.	61 47 46	3476	63 8 37	3472	64 29 32	3470	65 50 30	3467
	VENUS	E.	53 2 35	3374	51 39 49	3386	50 17 17	3398	48 54 58	3408
	Pollux	E.	62 21 45	2978	60 51 5	2989	59 20 39	3000	57 50 26	3010
	MARS	E.	76 57 36	3186	75 31 10	3197	74 4 57	3207	72 38 56	3217
	SUN	E.	95 2 37	3316	93 38 44	3328	92 15 5	3338	90 51 38	3349
18	Fomalhaut	W.	88 44 13	3215	90 10 4	3222	91 35 47	3230	93 1 21	3236
	α Pegasi	W.	72 35 47	3463	73 56 53	3463	75 17 58	3463	76 39 3	3464
	VENUS	E.	42 6 13	3454	40 44 58	3463	39 23 52	3471	38 2 55	3478
	Pollux	E.	50 22 29	3057	48 53 27	3066	47 24 36	3074	45 55 55	3082
	MARS	E.	65 31 39	3260	64 6 41	3267	62 41 51	3274	61 17 9	3281
	SUN	E.	83 57 12	3393	82 34 48	3401	81 12 33	3408	79 50 26	3415

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
19	Fomalhaut	W.	94° 26′ 47″	3242	95° 52′ 6″	3247	97° 17′ 19″	3253	98° 42′ 25″	3259
	α Pegasi	W.	78 0 7	3465	79 21 10	3465	80 42 13	3466	82 3 15	3468
	α Arietis	W.	34 23 37	3513	35 43 47	3484	37 4 29	3460	38 25 38	3438
	Venus	E.	36 42 6	3484	35 21 24	3490	34 0 49	3496	32 40 20	3500
	Pollux	E.	44 27 24	3090	42 59 2	3098	41 30 50	3105	40 2 46	3112
	Mars	E.	59 52 35	3286	58 28 7	3291	57 3 45	3296	55 39 29	3300
	Sun	E.	78 28 26	3421	77 6 33	3426	75 44 46	3431	74 23 5	3436
20	Fomalhaut	W.	105 46 23	3284	107 10 53	3288	108 35 18	3294	109 59 37	3298
	α Pegasi	W.	88 48 7	3472	90 9 2	3474	91 29 55	3475	92 50 47	3477
	α Arietis	W.	45 16 47	3358	46 39 52	3345	48 3 12	3333	49 26 45	3322
	Venus	E.	25 59 9	3521	24 39 8	3524	23 19 10	3526	21 59 15	3529
	Pollux	E.	32 44 38	3148	31 17 27	3157	29 50 26	3165	28 23 35	3175
	Mars	E.	48 39 8	3313	47 15 12	3315	45 51 18	3316	44 27 25	3317
	Sun	E.	67 35 44	3451	66 14 25	3453	64 53 8	3454	63 31 53	3454
21	α Arietis	W.	56 27 30	3275	57 52 11	3265	59 17 3	3257	60 42 5	3248
	Aldebaran	W.	23 58 28	3095	25 26 44	3091	26 55 5	3086	28 23 32	3081
	Mars	E.	37 28 1	3313	36 4 4	3311	34 40 5	3308	33 16 3	3306
	Sun	E.	56 45 38	3452	55 24 20	3451	54 3 1	3448	52 41 39	3446
22	α Arietis	W.	67 49 41	3208	69 15 41	3199	70 41 51	3191	72 8 11	3183
	Aldebaran	W.	35 47 19	3055	37 16 24	3049	38 45 36	3043	40 14 56	3037
	Sun	E.	45 54 3	3430	44 32 20	3425	43 10 32	3421	41 48 39	3416
23	α Arietis	W.	79 22 16	3143	80 49 34	3133	82 17 3	3125	83 44 42	3117
	Aldebaran	W.	47 43 32	3003	49 13 41	2995	50 44 0	2988	52 14 28	2981
	Sun	E.	34 57 53	3392	33 35 27	3386	32 12 55	3382	30 50 18	3378
24	α Arietis	W.	91 5 27	3076	92 34 6	3068	94 2 55	3060	95 31 54	3052
	Aldebaran	W.	59 49 15	2939	61 20 44	2931	62 52 24	2922	64 24 15	2913
	Venus	W.	17 26 8	3386	18 48 41	3373	20 11 28	3361	21 34 29	3349
	Sun	E.	23 56 2	3361	22 33 1	3361	21 10 0	3364	19 47 2	3367
28	Sun	W.	23 19 55	3044	24 49 13	3026	26 18 53	3010	27 48 53	2996
	Antares	E.	70 37 50	2681	69 0 45	2673	67 23 29	2666	65 46 3	2658
	Jupiter	E.	90 17 56	2646	88 40 3	2638	87 1 59	2629	85 23 43	2620
29	Sun	W.	35 23 2	2935	36 54 37	2924	38 26 26	2913	39 58 28	2902
	Antares	E.	57 36 25	2623	55 58 1	2617	54 19 29	2611	52 40 49	2605
	Jupiter	E.	77 9 30	2579	75 30 6	2570	73 50 30	2562	72 10 43	2554
	α Aquilæ	E.	103 44 3	3281	102 19 29	3264	100 54 35	3247	99 29 22	3232
30	Sun	W.	47 41 55	2853	49 15 14	2844	50 48 45	2835	52 22 27	2826
	Antares	E.	44 25 41	2583	42 46 22	2580	41 6 59	2577	39 27 33	2575
	Jupiter	E.	63 49 3	2515	62 8 10	2507	60 27 7	2499	58 45 53	2492
	α Aquilæ	E.	92 19 20	3175	90 52 41	3167	89 25 52	3159	87 58 54	3153
31	Sun	W.	60 13 53	2782	61 48 44	2774	63 23 46	2765	64 59 0	2757
	Spica	W.	17 20 3	2813	18 54 14	2747	20 29 52	2693	22 6 41	2650
	Jupiter	E	50 17 4	2455	48 34 47	2447	46 52 19	2440	45 9 41	2433
	α Aquilæ	E.	80 42 35	3138	79 15 11	3138	77 47 47	3140	76 20 26	3143

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P.L. of Diff.	XVh.	P.L. of Diff.	XVIIIh.	P.L. of Diff.	XXIh.	P.L. of Diff
19	Fomalhaut	W.	100° 7′ 25″	3264	101° 32′ 19″	3270	102° 57′ 6″	3275	104° 21′ 47″	3279
	α Pegasi	W.	83 24 15	3469	84 45 14	3469	86 6 13	3470	87 27 11	3471
	α Arietis	W.	39 47 12	3418	41 9 8	3401	42 31 23	3385	43 53 57	3371
	Venus	E.	31 19 56	3505	29 59 37	3509	28 39 23	3514	27 19 14	3517
	Pollux	E.	38 34 51	3119	37 7 5	3126	35 39 27	3133	34 11 58	3141
	Mars	E.	54 15 17	3303	52 51 9	3306	51 27 5	3310	50 3 5	3313
	Sun	E.	73 1 29	3439	71 39 57	3443	70 18 29	3446	68 57 5	3449
20	Fomalhaut	W.	111 23 51	3302	112 48 0	3307	114 12 3	3312	115 36 1	3316
	α Pegasi	W.	94 11 37	3478	95 32 26	3480	96 53 13	3481	98 13 58	3483
	α Arietis	W.	50 50 31	3312	52 14 29	3302	53 38 38	3292	55 2 59	3283
	Venus	E.	20 39 23	3532	19 19 34	3535	17 59 48	3537	16 40 5	3541
	Pollux	E.	26 56 56	3186	25 30 30	3198	24 4 19	3213	22 38 25	3231
	Mars	E.	43 3 33	3317	41 39 41	3317	40 15 49	3316	38 51 56	3314
	Sun	E.	62 10 38	3455	60 49 24	3455	59 28 10	3454	58 6 55	3453
21	α Arietis	W.	62 7 17	3240	63 32 39	3232	64 58 10	3224	66 23 51	3216
	Aldebaran	W.	29 52 5	3076	31 20 44	3071	32 49 29	3065	34 18 21	3060
	Mars	E.	31 51 59	3303	30 27 51	3300	29 3 39	3296	27 39 23	3292
	Sun	E.	51 20 15	3444	49 58 48	3440	48 37 17	3437	47 15 42	3433
22	α Arietis	W.	73 34 40	3175	75 1 19	3167	76 28 8	3158	77 55 7	3150
	Aldebaran	W.	41 44 23	3030	43 13 58	3024	44 43 41	3018	46 13 32	3010
	Sun	E.	40 26 41	3411	39 4 37	3407	37 42 28	3401	36 20 13	3397
23	α Arietis	W	85 12 31	3109	86 40 30	3101	88 8 39	3092	89 36 58	3084
	Aldebaran	W.	53 45 5	2973	55 15 52	2965	56 46 49	2956	58 17 57	2948
	Sun	E.	29 27 36	3373	28 4 49	3369	26 41 57	3365	25 19 1	3363
24	α Arietis	W.	97 1 3	3044	98 30 21	3036	99 59 49	3029	101 29 26	3021
	Aldebaran	W.	65 56 17	2905	67 28 30	2895	69 0 55	2886	70 33 32	2877
	Venus	W.	22 57 44	3338	24 21 12	3326	25 44 53	3315	27 8 47	3304
	Sun	E.	18 24 8	3374	17 1 22	3388	15 38 49	3403	14 16 36	3431
28	Sun	W.	29 19 11	2983	30 49 45	2970	32 20 35	2958	33 51 41	2946
	Antares	E.	64 8 27	2651	62 30 41	2643	60 52 45	2637	59 14 40	2629
	Jupiter	E.	83 45 15	2612	82 6 36	2603	80 27 45	2595	78 48 43	2587
29	Sun	W.	41 30 44	2892	43 3 13	2883	44 35 54	2873	46 8 48	2862
	Antares	E.	51 2 1	2599	49 23 5	2595	47 44 3	2591	46 4 55	2586
	Jupiter	E.	70 30 45	2546	68 50 36	2538	67 10 16	2530	65 29 45	2522
	α Aquilæ	E.	98 3 51	3219	96 38 4	3207	95 12 3	3195	93 45 48	3184
30	Sun	W.	53 56 21	2817	55 30 27	2808	57 4 44	2799	58 39 13	2791
	Antares	E.	37 48 4	2574	36 8 34	2575	34 29 5	2577	32 49 39	2582
	Jupiter	E.	57 4 29	2485	55 22 54	2477	53 41 8	2469	51 59 11	2462
	α Aquilæ	E.	86 31 48	3148	85 4 36	3143	83 37 19	3140	82 9 58	3138
31	Sun	W.	66 34 24	2749	68 9 59	2741	69 45 45	2732	71 21 42	2724
	Spica	W.	23 44 28	2614	25 23 4	2583	27 2 22	2556	28 42 17	2533
	Jupiter	E.	43 26 53	2425	41 43 54	2418	40 0 45	2411	38 17 26	2404
	α Aquilæ	E.	74 53 8	3147	73 25 55	3153	71 58 50	3161	70 31 54	3169

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.	Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		h m s	s	° ′ ″	″	′ ″	s	m s	s
SUN.	1	10 43 8.10	9.067	N. 8 7 35.6	–54.60	15 53.76	64.39	0 13.32	0.787
Mon.	2	10 46 45.55	9.055	7 45 41.2	54.92	15 54.00	64.35	0 32.37	0.799
Tues.	3	10 50 22.71	9.043	7 23 39.3	55.23	15 54.24	64.31	0 51.71	0.811
Wed.	4	10 53 59.60	9.032	7 1 30.3	–55.52	15 54.48	64.27	1 11.32	0.822
Thur.	5	10 57 36.24	9.022	6 39 14.6	55.80	15 54.73	64.24	1 31.18	0.832
Frid.	6	11 1 12.64	9.013	6 16 52.4	56.06	15 54.98	64.21	1 51.27	0.841
Sat.	7	11 4 48.83	9.004	5 54 24.0	–56.31	15 55.23	64.19	2 11.57	0.850
SUN.	8	11 8 24.83	8.997	5 31 49.8	56.55	15 55.48	64.16	2 32.07	0.857
Mon.	9	11 12 0.66	8.990	5 9 10.1	56.77	15 55.73	64.14	2 52.74	0.864
Tues.	10	11 15 36.34	8.985	4 46 25.2	–56.98	15 55.98	64.12	3 13.56	0.869
Wed.	11	11 19 11.90	8.981	4 23 35.4	57.17	15 56.23	64.10	3 34.49	0.874
Thur.	12	11 22 47.36	8.977	4 0 41.0	57.35	15 56.48	64.08	3 55.52	0.877
Frid.	13	11 26 22.74	8.974	3 37 42.3	–57.52	15 56.74	64.07	4 16.63	0.880
Sat.	14	11 29 58.07	8.972	3 14 39.6	57.68	15 56.99	64.06	4 37.81	0.882
SUN.	15	11 33 33.36	8.971	2 51 33.2	57.83	15 57.25	64.05	4 59.01	0.883
Mon.	16	11 37 8.65	8.971	2 28 23.5	–57.96	15 57.50	64.05	5 20.23	0.883
Tues.	17	11 40 43.94	8.972	2 5 10.8	58.08	15 57.76	64.05	5 41.43	0.882
Wed.	18	11 44 19.26	8.974	1 41 55.3	58.19	15 58.02	64.05	6 2.61	0.880
Thur.	19	11 47 54.63	8.976	1 18 37.4	–58.28	15 58.28	64.06	6 23.73	0.878
Frid.	20	11 51 30.08	8.979	0 55 17.5	58.36	15 58.54	64.07	6 44.78	0.875
Sat.	21	11 55 5.61	8.983	0 31 55.9	58.42	15 58.80	64.08	7 5.74	0.871
SUN.	22	11 58 41.24	8.988	N. 0 8 32.9	–58.47	15 59.07	64.09	7 26.60	0.866
Mon.	23	12 2 17.00	8.993	S. 0 14 51.1	58.51	15 59.34	64.11	7 47.34	0.861
Tues.	24	12 5 52.90	8.999	0 38 15.7	58.53	15 59.61	64.13	8 7.93	0.855
Wed.	25	12 9 28.95	9.006	1 1 40.6	–58.53	15 59.88	64.16	8 28.37	0.848
Thur.	26	12 13 5.18	9.014	1 25 5.4	58.52	16 0.16	64.19	8 48.65	0.840
Frid.	27	12 16 41.60	9.022	1 48 29.7	58.49	16 0.44	64.22	9 8.74	0.832
Sat.	28	12 20 18.22	9.031	2 11 53.1	–58.45	16 0.72	64.25	9 28.61	0.823
SUN.	29	12 23 55.06	9.041	2 35 15.4	58.39	16 1.00	64.29	9 48.25	0.813
Mon.	30	12 27 32.15	9.051	2 58 36.2	58.31	16 1.28	64.33	10 7.66	0.803
Tues.	31	12 31 9.50	9.062	S. 3 21 54.9	–58.23	16 1.56	64.37	10 26.81	0.792

Note.—The mean time of semidiameter passing may be found by subtracting $0^{s}.18$ from the sidereal time.
The sign – prefixed to the hourly change of declination indicates that north declinations are decreasing; south declinations, increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	THE SUN'S Diff. for 1 Hour.	THE SUN'S Apparent Declination.	THE SUN'S Diff. for 1 Hour.	Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ′ ″	″	m s	s	h m s
SUN.	1	10 43 8.13	9.069	N. 8 7 35.4	-54.61	0 13.32	0.787	10 43 21.45
Mon.	2	10 46 45.63	9.057	7 45 40.7	54.93	0 32.37	0.799	10 47 18.00
Tues.	3	10 50 22.84	9.045	7 23 38.6	55.24	0 51.71	0.811	10 51 14.55
Wed.	4	10 53 59.78	9.034	7 1 29.3	-55.53	1 11.33	0.822	10 55 11.11
Thur.	5	10 57 36.47	9.024	6 39 13.2	55.81	1 31.19	0.832	10 59 7.66
Frid.	6	11 1 12.92	9.015	6 16 50.6	56.07	1 51.29	0.841	11 3 4.21
Sat.	7	11 4 49.16	9.006	5 54 22.0	-56.32	2 11.60	0.850	11 7 0.76
SUN.	8	11 8 25.21	8.999	5 31 47.5	56.56	2 32.11	0.857	11 10 57.32
Mon.	9	11 12 1.09	8.992	5 9 7.5	56.78	2 52.78	0.864	11 14 53.87
Tues.	10	11 15 36.82	8.987	4 46 22.2	-56.99	3 13.60	0.869	11 18 50.42
Wed.	11	11 19 12.43	8.982	4 23 32.0	57.19	3 34.54	0.874	11 22 46.97
Thur.	12	11 22 47.94	8.979	4 0 37.3	57.37	3 55.58	0.877	11 26 43.52
Frid.	13	11 26 23.38	8.976	3 37 38.2	-57.54	4 16.69	0.880	11 30 40.07
Sat.	14	11 29 58.76	8.974	3 14 35.2	57.70	4 37.87	0.882	11 34 36.63
SUN.	15	11 33 34.10	8.973	2 51 28.5	57.85	4 59.08	0.883	11 38 33.18
Mon.	16	11 37 9.44	8.973	2 28 18.4	-57.98	5 20.30	0.883	11 42 29.74
Tues.	17	11 40 44.79	8.974	2 5 5.3	58.10	5 41.51	0.882	11 46 26.30
Wed.	18	11 44 20.16	8.976	1 41 49.5	58.21	6 2.69	0.880	11 50 22.85
Thur.	19	11 47 55.58	8.978	1 18 31.3	-58.30	6 23.82	0.878	11 54 19.40
Frid.	20	11 51 31.08	8.981	0 55 11.0	58.38	6 44.87	0.875	11 58 15.95
Sat.	21	11 55 6.67	8.985	0 31 49.0	58.44	7 5.84	0.871	12 2 12.51
SUN.	22	11 58 42.35	8.990	N. 0 8 25.7	-58.49	7 26.71	0.866	12 6 9.06
Mon.	23	12 2 18.16	8.995	S. 0 14 58.6	58.53	7 47.45	0.861	12 10 5.61
Tues.	24	12 5 54.11	9.001	0 38 23.6	58.55	8 8.05	0.855	12 14 2.16
Wed.	25	12 9 30.22	9.008	1 1 48.9	-58.55	8 28.49	0.848	12 17 58.71
Thur.	26	12 13 6.50	9.016	1 25 14.0	58.54	8 48.77	0.840	12 21 55.27
Frid.	27	12 16 42.96	9.024	1 48 38.6	58.51	9 8.86	0.832	12 25 51.82
Sat.	28	12 20 19.64	9.033	2 12 2.4	-58.47	9 28.73	0.823	12 29 48.37
SUN.	29	12 23 56.54	9.043	2 35 25.0	58.41	9 48.38	0.813	12 33 44.92
Mon.	30	12 27 33.68	9.053	2 58 46.1	58.33	10 7.79	0.803	12 37 41.47
Tues.	31	12 31 11.09	9.064	S. 3 22 5.1	-58.24	10 26.94	0.792	12 41 38.03

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing; south declinations, increasing.

Diff. for 1 hour,
+ 9ˢ.8565.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S TRUE LONGITUDE. λ	THE SUN'S TRUE LONGITUDE. λ′	THE SUN'S Diff. for 1 Hour.	THE SUN'S LATITUDE.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		° ′ ″	′ ″	″	″			h m s
1	244	159 12 6.4	11 49.2	145.33	+ 0.16	0.0037347	−45.1	13 14 28.04
2	245	160 10 14.8	9 57.5	145.39	+ 0.05	0.0036258	45.6	13 10 32.13
3	246	161 8 24.6	8 7.2	145.44	− 0.07	0.0035157	46.1	13 6 36.23
4	247	162 6 35.9	6 18.4	145.50	− 0.20	0.0034046	−46.5	13 2 40.32
5	248	163 4 48.7	4 31.1	145.56	0.33	0.0032927	46.8	12 58 44.41
6	249	164 3 3.1	2 45.4	145.62	0.46	0.0031802	47.1	12 54 48.50
7	250	165 1 19.0	1 1.2	145.69	− 0.56	0.0030673	−47.3	12 50 52.59
8	251	165 59 36.5	59 18.6	145.76	0.65	0.0029539	47.4	12 46 56.69
9	252	166 57 55.7	57 37.7	145.83	0.73	0.0028401	47.5	12 43 0.78
10	253	167 56 16.7	55 58.6	145.91	− 0.78	0.0027259	−47.6	12 39 4.87
11	254	168 54 39.6	54 21.4	145.99	0.79	0.0026114	47.7	12 35 8.97
12	255	169 53 4.5	52 46.2	146.08	0.76	0.0024968	47.8	12 31 13.07
13	256	170 51 31.4	51 13.0	146.17	− 0.70	0.0023820	−47.9	12 27 17.16
14	257	171 50 0.3	49 41.8	146.25	0.63	0.0022669	48.0	12 23 21.25
15	258	172 48 31.4	48 12.8	146.34	0.54	0.0021514	48.2	12 19 25.34
16	259	173 47 4.7	46 46.0	146.43	− 0.42	0.0020354	−48.4	12 15 29.43
17	260	174 45 40.2	45 21.4	146.52	0.28	0.0019189	48.7	12 11 33.52
18	261	175 44 17.9	43 59.0	146.61	0.14	0.0018018	49.0	12 7 37.61
19	262	176 42 57.8	42 38.8	146.71	− 0.01	0.0016839	−49.3	12 3 41.71
20	263	177 41 39.9	41 20.8	146.80	+ 0.11	0.0015651	49.7	11 59 45.81
21	264	178 40 24.2	40 5.0	146.89	0.23	0.0014454	50.1	11 55 49.90
22	265	179 39 10.6	38 51.3	146.98	+ 0.31	0.0013248	−50.5	11 51 53.99
23	266	180 37 59.2	37 39.8	147.07	0.37	0.0012033	50.9	11 47 58.09
24	267	181 36 50.0	36 30.5	147.16	0.40	0.0010807	51.3	11 44 2.19
25	268	182 35 42.8	35 23.2	147.24	+ 0.41	0.0009571	−51.7	11 40 6.28
26	269	183 34 37.5	34 17.8	147.32	0.38	0.0008325	52.1	11 36 10.37
27	270	184 33 34.1	33 14.4	147.40	0.32	0.0007070	52.4	11 32 14.46
28	271	185 32 32.6	32 12.8	147.48	+ 0.24	0.0005808	−52.7	11 28 18.56
29	272	186 31 32.9	31 13.0	147.55	0.14	0.0004539	53.0	11 24 22.65
30	273	187 30 35.1	30 15.1	147.63	+ 0.02	0.0003265	53.2	11 20 26.74
31	274	188 29 39.0	29 18.9	147.70	− 0.11	0.0001987	−53.3	11 16 30.84

NOTE.—The numbers in column λ correspond to the true equinox of the date; in column λ′, to the mean equinox of January $0^d.0$.

Diff. for 1 Hour,
— $9^s.8296$.
(Table II.)

GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	15 59.3	16 2.7	58 34.1	+1.06	58 46.5	+1.01	4 49.7	2.21	5.9
2	16 5.9	16 8.9	58 58.2	0.95	59 9.1	0.87	5 44.3	2.35	6.9
3	16 11.6	16 13.9	59 19.0	0.78	59 27.7	0.67	6 42.1	2.47	7.9
4	16 15.9	16 17.4	59 35.0	+0.54	59 40.5	+0.39	7 42.4	2.54	8.9
5	16 18.4	16 18.8	59 44.1	+0.22	59 45.6	+0.02	8 43.4	2.53	9.9
6	16 18.5	16 17.6	59 44.6	−0.19	59 41.1	−0.41	9 43.4	2.45	10.9
7	16 15.9	16 13.5	59 34.8	−0.64	59 25.9	−0.86	10 40.7	2.32	11.9
8	16 10.3	16 6.5	59 14.4	1.07	59 0.3	1.27	11 34.8	2.18	12.9
9	16 2.0	15 57.0	58 44.0	1.45	58 25.6	1.60	12 25.7	2.06	13.9
10	15 51.6	15 45.8	58 5.7	−1.72	57 44.4	−1.81	13 14.0	1.97	14.9
11	15 39.8	15 33.8	57 22.4	1.85	57 0.1	1.86	14 0.6	1.92	15.9
12	15 27.7	15 21.9	56 37.8	1.84	56 16.1	1.78	14 46.3	1.90	16.9
13	15 16.1	15 10.8	55 55.3	−1.69	55 35.7	−1.57	15 31.9	1.91	17.9
14	15 5.9	15 1.5	55 17.8	1.42	55 1.7	1.26	16 18.0	1.94	18.9
15	14 57.7	14 54.5	54 47.8	1.07	54 36.1	0.87	17 4.9	1.98	19.9
16	14 52.0	14 50.2	54 26.9	−0.67	54 20.2	−0.46	17 52.9	2.02	20.9
17	14 49.1	14 48.7	54 16.1	−0.24	54 14.6	−0.02	18 41.8	2.05	21.9
18	14 49.0	14 50.0	54 15.7	+0.20	54 19.3	+0.41	19 31.1	2.05	22.9
19	14 51.6	14 53.9	54 25.3	+0.61	54 33.7	+0.79	20 20.4	2.04	23.9
20	14 56.8	15 0.1	54 44.2	0.96	54 56.6	1.11	21 9.1	2.02	24.9
21	15 4.0	15 8.2	55 10.7	1.24	55 26.3	1.35	21 57.1	1.98	25.9
22	15 12.8	15 17.6	55 43.1	+1.44	56 0.7	+1.50	22 44.3	1.95	26.9
23	15 22.5	15 27.5	56 18.9	1.53	56 37.3	1.54	23 31.0	1.94	27.9
24	15 32.5	15 37.4	56 55.6	1.52	57 13.6	1.47	☌		28.9
25	15 42.1	15 46.6	57 30.9	+1.41	57 47.3	+1.32	0 17.8	1.96	0.4
26	15 50.7	15 54.5	58 2.5	1.22	58 16.4	1.11	1 5.3	2.01	1.4
27	15 57.9	16 0.9	58 28.9	0.98	58 39.9	0.86	1 54.4	2.09	2.4
28	16 3.5	16 5.6	58 49.3	+0.72	58 57.1	+0.60	2 45.8	2.20	3.4
29	16 7.4	16 8.7	59 3.5	0.48	59 8.4	0.36	3 40.1	2.33	4.4
30	16 9.7	16 10.3	59 12.0	0.25	59 14.3	+0.14	4 37.2	2.44	5.4
31	16 10.6	16 10.5	59 15.3	+0.04	59 15.1	−0.07	5 36.5	2.50	6.4

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SUNDAY 1.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	15 22 51.31	2.2668	S.14 38 14.4	10.710
1	15 25 7.47	2.2717	14 48 54.7	10.633
2	15 27 23.92	2.2767	14 59 30.4	10.555
3	15 29 40.67	2.2817	15 10 1.3	10.475
4	15 31 57.72	2.2867	15 20 27.4	10.395
5	15 34 15.08	2.2918	15 30 48.7	10.313
6	15 36 32.74	2.2969	15 41 5.0	10.229
7	15 38 50.71	2.3021	15 51 16.2	10.144
8	15 41 8.99	2.3072	16 1 22.3	10.058
9	15 43 27.57	2.3123	16 11 23.2	9.971
10	15 45 46.46	2.3175	16 21 18.8	9.882
11	15 48 5.67	2.3227	16 31 9.0	9.792
12	15 50 25.19	2.3279	16 40 53.8	9.700
13	15 52 45.02	2.3331	16 50 33.0	9.607
14	15 55 5.16	2.3383	17 0 6.6	9.513
15	15 57 25.62	2.3436	17 9 34.6	9.418
16	15 59 46.39	2.3487	17 18 56.8	9.321
17	16 2 7.47	2.3539	17 28 13.1	9.222
18	16 4 28.86	2.3592	17 37 23.5	9.123
19	16 6 50.57	2.3644	17 46 27.9	9.022
20	16 9 12.59	2.3697	17 55 26.1	8.919
21	16 11 34.93	2.3749	18 4 18.2	8.816
22	16 13 57.58	2.3801	18 13 4.1	8.712
23	16 16 20.54	2.3853	S.18 21 43.6	8.605

MONDAY 2.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	16 18 43.82	2.3906	S.18 30 16.7	8.497
1	16 21 7.41	2.3958	18 38 43.3	8.389
2	16 23 31.31	2.4009	18 47 3.4	8.279
3	16 25 55.52	2.4061	18 55 16.8	8.167
4	16 28 20.04	2.4112	19 3 23.5	8.055
5	16 30 44.87	2.4164	19 11 23.4	7.942
6	16 33 10.01	2.4216	19 19 16.5	7.827
7	16 35 35.46	2.4267	19 27 2.6	7.710
8	16 38 1.21	2.4317	19 34 41.7	7.592
9	16 40 27.26	2.4367	19 42 13.6	7.473
10	16 42 53.61	2.4417	19 49 38.4	7.353
11	16 45 20.26	2.4467	19 56 56.0	7.232
12	16 47 47.21	2.4516	20 4 6.2	7.109
13	16 50 14.45	2.4565	20 11 9.0	6.985
14	16 52 41.99	2.4614	20 18 4.4	6.860
15	16 55 9.82	2.4662	20 24 52.2	6.733
16	16 57 37.94	2.4710	20 31 32.4	6.606
17	17 0 6.34	2.4758	20 38 4.9	6.477
18	17 2 35.03	2.4805	20 44 29.7	6.347
19	17 5 4.00	2.4851	20 50 46.6	6.217
20	17 7 33.24	2.4896	20 56 55.7	6.085
21	17 10 2.75	2.4941	21 2 56.8	5.951
22	17 12 32.53	2.4986	21 8 49.8	5.817
23	17 15 2.58	2.5030	21 14 34.8	5.682
24	17 17 32.89	2.5073	S.21 20 11.6	5.545

TUESDAY 3.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	17 17 32.89	2.5073	S.21 20 11.6	5.545
1	17 20 3.46	2.5116	21 25 40.2	5.407
2	17 22 34.28	2.5159	21 31 0.5	5.269
3	17 25 5.36	2.5201	21 36 12.5	5.130
4	17 27 36.69	2.5242	21 41 16.1	4.989
5	17 30 8.26	2.5281	21 46 11.2	4.847
6	17 32 40.06	2.5320	21 50 57.8	4.705
7	17 35 12.10	2.5359	21 55 35.8	4.562
8	17 37 44.37	2.5397	22 0 5.2	4.418
9	17 40 16.86	2.5433	22 4 25.9	4.273
10	17 42 49.57	2.5469	22 8 37.9	4.127
11	17 45 22.49	2.5504	22 12 41.1	3.979
12	17 47 55.62	2.5538	22 16 35.4	3.831
13	17 50 28.95	2.5572	22 20 20.8	3.683
14	17 53 2.48	2.5605	22 23 57.3	3.533
15	17 55 36.21	2.5637	22 27 24.8	3.382
16	17 58 10.12	2.5667	22 30 43.2	3.231
17	18 0 44.21	2.5697	22 33 52.5	3.080
18	18 3 18.48	2.5726	22 36 52.8	2.928
19	18 5 52.92	2.5753	22 39 43.9	2.774
20	18 8 27.52	2.5779	22 42 25.7	2.620
21	18 11 2.27	2.5804	22 44 58.3	2.466
22	18 13 37.17	2.5829	22 47 21.7	2.312
23	18 16 12.22	2.5852	S.22 49 35.7	2.156

WEDNESDAY 4.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	18 18 47.40	2.5874	S.22 51 40.4	2.000
1	18 21 22.71	2.5896	22 53 35.7	1.844
2	18 23 58.15	2.5917	22 55 21.6	1.687
3	18 26 33.71	2.5936	22 56 58.1	1.529
4	18 29 9.38	2.5953	22 58 25.1	1.371
5	18 31 45.15	2.5970	22 59 42.6	1.212
6	18 34 21.02	2.5986	23 0 50.6	1.054
7	18 36 56.98	2.6000	23 1 49.1	0.895
8	18 39 33.02	2.6013	23 2 38.0	0.735
9	18 42 9.14	2.6026	23 3 17.3	0.575
10	18 44 45.33	2.6037	23 3 47.0	0.416
11	18 47 21.58	2.6046	23 4 7.2	0.256
12	18 49 57.88	2.6054	23 4 17.8	− 0.096
13	18 52 34.23	2.6062	23 4 18.7	+ 0.065
14	18 55 10.62	2.6068	23 4 10.0	0.225
15	18 57 47.04	2.6073	23 3 51.7	0.386
16	19 0 23.49	2.6076	23 3 23.7	0.547
17	19 2 59.95	2.6078	23 2 46.1	0.707
18	19 5 36.42	2.6079	23 1 58.8	0.868
19	19 8 12.90	2.6079	23 1 1.9	1.028
20	19 10 49.37	2.6077	22 59 55.4	1.189
21	19 13 25.83	2.6075	22 58 39.2	1.350
22	19 16 2.27	2.6072	22 57 13.4	1.510
23	19 18 38.69	2.6067	22 55 38.0	1.671
24	19 21 15.07	2.6061	S.22 53 52.9	1.832

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	THURSDAY 5.					**SATURDAY 7.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	19 21 15.07	2.6061	S.22 53 52.9	1.839	0	21 23 33.01	2.4554	S.18 32 43.5	8.700
1	19 23 51.41	2.6053	22 51 58.2	1.991	1	21 26 0.19	2.4506	18 23 58.0	8.816
2	19 26 27.70	2.6044	22 49 54.0	2.149	2	21 28 27.08	2.4457	18 15 5.6	8.930
3	19 29 3.94	2.6034	22 47 40.3	2.308	3	21 30 53.67	2.4407	18 6 6.4	9.043
4	19 31 40.11	2.6023	22 45 17.0	2.467	4	21 33 19.96	2.4356	17 57 0.4	9.156
5	19 34 16.21	2.6011	22 42 44.2	2.626	5	21 35 45.94	2.4305	17 47 47.7	9.266
6	19 36 52.24	2.5998	22 40 1.9	2.784	6	21 38 11.62	2.4254	17 38 28.5	9.374
7	19 39 28.18	2.5983	22 37 10.1	2.942	7	21 40 36.99	2.4203	17 29 2.8	9.482
8	19 42 4.03	2.5967	22 34 8.9	3.099	8	21 43 2.06	2.4152	17 19 30.7	9.588
9	19 44 39.78	2.5949	22 30 58.2	3.256	9	21 45 26.82	2.4101	17 9 52.2	9.693
10	19 47 15.42	2.5931	22 27 38.1	3.412	10	21 47 51.27	2.4049	17 0 7.5	9.796
11	19 49 50.96	2.5913	22 24 8.7	3.568	11	21 50 15.41	2.3997	16 50 16.7	9.897
12	19 52 26.38	2.5893	22 20 29.9	3.724	12	21 52 39.24	2.3945	16 40 19.9	9.997
13	19 55 1.67	2.5871	22 16 41.8	3.878	13	21 55 2.75	2.3893	16 30 17.1	10.096
14	19 57 36.83	2.5848	22 12 44.5	4.032	14	21 57 25.95	2.3841	16 20 8.4	10.193
15	20 0 11.85	2.5824	22 8 38.0	4.185	15	21 59 48.84	2.3788	16 9 54.0	10.288
16	20 2 46.72	2.5799	22 4 22.3	4.338	16	22 2 11.41	2.3736	15 59 33.9	10.382
17	20 5 21.44	2.5774	21 59 57.4	4.490	17	22 4 33.67	2.3683	15 49 8.2	10.473
18	20 7 56.01	2.5748	21 55 23.5	4.640	18	22 6 55.61	2.3630	15 38 37.1	10.563
19	20 10 30.42	2.5720	21 50 40.6	4.791	19	22 9 17.23	2.3578	15 28 0.6	10.653
20	20 13 4.65	2.5690	21 45 48.6	4.941	20	22 11 38.54	2.3526	15 17 18.7	10.742
21	20 15 38.70	2.5660	21 40 47.7	5.089	21	22 13 59.54	2.3473	15 6 31.6	10.828
22	20 18 12.57	2.5630	21 35 37.9	5.237	22	22 16 20.22	2.3421	14 55 39.4	10.912
23	20 20 46.26	2.5598	S.21 30 19.3	5.383	23	22 18 40.59	2.3368	S.14 44 42.2	10.995
	FRIDAY 6.					**SUNDAY 8.**			
0	20 23 19.75	2.5565	S.21 24 51.9	5.529	0	22 21 0.64	2.3316	S.14 33 40.0	11.077
1	20 25 53.04	2.5532	21 19 15.8	5.674	1	22 23 20.38	2.3263	14 22 33.0	11.157
2	20 28 26.13	2.5498	21 13 31.0	5.818	2	22 25 39.80	2.3211	14 11 21.2	11.235
3	20 30 59.01	2.5463	21 7 37.6	5.962	3	22 27 58.91	2.3159	14 0 4.8	11.312
4	20 33 31.68	2.5426	21 1 35.6	6.104	4	22 30 17.71	2.3107	13 48 43.8	11.387
5	20 36 4.12	2.5389	20 55 25.1	6.245	5	22 32 36.20	2.3055	13 37 18.4	11.460
6	20 38 36.34	2.5351	20 49 6.2	6.385	6	22 34 54.37	2.3003	13 25 48.6	11.532
7	20 41 8.33	2.5312	20 42 38.9	6.524	7	22 37 12.24	2.2952	13 14 14.5	11.603
8	20 43 40.08	2.5273	20 36 3.3	6.662	8	22 39 29.80	2.2901	13 2 36.2	11.672
9	20 46 11.60	2.5233	20 29 19.5	6.798	9	22 41 47.05	2.2850	12 50 53.9	11.739
10	20 48 42.88	2.5192	29 22 27.6	6.933	10	22 44 4.00	2.2799	12 39 7.6	11.805
11	20 51 13.91	2.5150	20 15 27.5	7.068	11	22 46 20.64	2.2748	12 27 17.3	11.870
12	20 53 44.68	2.5107	20 8 19.4	7.202	12	22 48 36.98	2.2698	12 15 23.2	11.932
13	20 56 15.20	2.5065	20 1 3.3	7.333	13	22 50 53.02	2.2648	12 3 25.4	11.993
14	20 58 45.46	2.5022	19 53 39.4	7.463	14	22 53 8.76	2.2598	11 51 24.0	12.052
15	21 1 15.46	2.4978	19 46 7.7	7.593	15	22 55 24.20	2.2549	11 39 19.1	12.111
16	21 3 45.19	2.4933	19 38 28.2	7.722	16	22 57 39.35	2.2500	11 27 10.7	12.168
17	21 6 14.65	2.4887	19 30 41.1	7.848	17	22 59 54.20	2.2451	11 14 58.9	12.223
18	21 8 43.83	2.4841	19 22 46.4	7.974	18	23 2 8.76	2.2402	11 2 43.9	12.277
19	21 11 12.74	2.4795	19 14 44.2	8.098	19	23 4 23.03	2.2354	10 50 25.7	12.329
20	21 13 41.37	2.4748	19 6 34.6	8.222	20	23 6 37.01	2.2306	10 38 4.4	12.379
21	21 16 9.71	2.4700	18 58 17.6	8.343	21	23 8 50.70	2.2259	10 25 40.2	12.428
22	21 18 37.77	2.4652	18 49 53.4	8.463	22	23 11 4.11	2.2212	10 13 13.1	12.476
23	21 21 5.54	2.4603	18 41 22.0	8.582	23	23 13 17.24	2.2165	10 0 43.1	12.523
24	21 23 33.01	2.4554	S.18 32 43.5	8.700	24	23 15 30.09	2.2118	S. 9 48 10.4	12 567

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

MONDAY 9.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	23 15 30.09	2.2118	S. 9 48 10.4	12.567
1	23 17 42.66	2.2072	9 35 35.1	12.609
2	23 19 54.96	2.2027	9 22 57.3	12.651
3	23 22 6.98	2.1982	9 10 17.0	12.692
4	23 24 18.74	2.1937	8 57 34.3	12.730
5	23 26 30.23	2.1892	8 44 49.4	12.767
6	23 28 41.45	2.1848	8 32 2.3	12.802
7	23 30 52.41	2.1805	8 19 13.1	12.837
8	23 33 3.11	2.1762	8 6 21.9	12.870
9	23 35 13.56	2.1720	7 53 28.7	12.902
10	23 37 23.75	2.1678	7 40 33.7	12.932
11	23 39 33.69	2.1636	7 27 36.9	12.960
12	23 41 43.38	2.1595	7 14 38.5	12.987
13	23 43 52.83	2.1554	7 1 38.5	13.013
14	23 46 2.03	2.1513	6 48 37.0	13.038
15	23 48 10.99	2.1474	6 35 34.0	13.061
16	23 50 19.72	2.1436	6 22 29.7	13.082
17	23 52 28.22	2.1397	6 9 24.1	13.102
18	23 54 36.48	2.1358	5 56 17.4	13.121
19	23 56 44.52	2.1321	5 43 9.6	13.139
20	23 58 52.33	2.1284	5 30 0.7	13.156
21	0 0 59.92	2.1247	5 16 50.9	13.171
22	0 3 7.29	2.1211	5 3 40.2	13.184
23	0 5 14.45	2.1175	S. 4 50 28.8	13.196

TUESDAY 10.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	0 7 21.39	2.1140	S. 4 37 16.7	13.207
1	0 9 28.13	2.1106	4 24 4.0	13.217
2	0 11 34.66	2.1072	4 10 50.7	13.226
3	0 13 40.99	2.1039	3 57 36.9	13.233
4	0 15 47.12	2.1006	3 44 22.7	13.239
5	0 17 53.06	2.0973	3 31 8.2	13.243
6	0 19 58.80	2.0941	3 17 53.5	13.247
7	0 22 4.35	2.0910	3 4 38.6	13.249
8	0 24 9.72	2.0880	2 51 23.6	13.250
9	0 26 14.91	2.0849	2 38 8.6	13.250
10	0 28 19.91	2.0819	2 24 53.6	13.249
11	0 30 24.74	2.0791	2 11 38.7	13.247
12	0 32 29.40	2.0763	1 58 24.0	13.243
13	0 34 33.89	2.0735	1 45 9.6	13.238
14	0 36 38.22	2.0707	1 31 55.5	13.232
15	0 38 42.38	2.0680	1 18 41.8	13.224
16	0 40 46.38	2.0654	1 5 28.6	13.216
17	0 42 50.23	2.0628	0 52 15.9	13.207
18	0 44 53.92	2.0602	0 39 3.8	13.196
19	0 46 57.46	2.0578	0 25 52.4	13.184
20	0 49 0.86	2.0555	S. 0 12 41.7	13.171
21	0 51 4.12	2.0531	N. 0 0 28.1	13.157
22	0 53 7.24	2.0508	0 13 37.1	13.143
23	0 55 10.22	2.0486	0 26 45.2	13.127
24	0 57 13.07	2.0464	N. 0 39 52.3	13.109

WEDNESDAY 11.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	0 57 13.07	2.0464	N. 0 39 52.3	13.109
1	0 59 15.79	2.0443	0 52 58.3	13.091
2	1 1 18.39	2.0422	1 6 3.2	13.072
3	1 3 20.86	2.0402	1 19 6.9	13.051
4	1 5 23.21	2.0382	1 32 9.3	13.029
5	1 7 25.45	2.0363	1 45 10.4	13.007
6	1 9 27.57	2.0344	1 58 10.2	12.984
7	1 11 29.58	2.0327	2 11 8.5	12.959
8	1 13 31.49	2.0310	2 24 5.3	12.934
9	1 15 33.30	2.0293	2 37 0.6	12.908
10	1 17 35.01	2.0277	2 49 54.3	12.881
11	1 19 36.62	2.0260	3 2 46.3	12.852
12	1 21 38.13	2.0244	3 15 36.5	12.822
13	1 23 39.55	2.0230	3 28 24.9	12.792
14	1 25 40.89	2.0217	3 41 11.5	12.762
15	1 27 42.15	2.0203	3 53 56.3	12.730
16	1 29 43.33	2.0190	4 6 39.1	12.697
17	1 31 44.43	2.0177	4 19 19.9	12.662
18	1 33 45.45	2.0164	4 31 58.6	12.627
19	1 35 46.40	2.0153	4 44 35.2	12.592
20	1 37 47.29	2.0142	4 57 9.6	12.555
21	1 39 48.11	2.0132	5 9 41.8	12.517
22	1 41 48.87	2.0122	5 22 11.7	12.479
23	1 43 49.57	2.0112	N. 5 34 39.3	12.440

THURSDAY 12.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	1 45 50.22	2.0103	N. 5 47 4.5	12.399
1	1 47 50.81	2.0095	5 59 27.2	12.358
2	1 49 51.36	2.0087	6 11 47.5	12.317
3	1 51 51.86	2.0080	6 24 5.3	12.275
4	1 53 52.32	2.0073	6 36 20.5	12.231
5	1 55 52.74	2.0067	6 48 33.0	12.186
6	1 57 53.12	2.0061	7 0 42.8	12.141
7	1 59 53.47	2.0056	7 12 49.9	12.095
8	2 1 53.79	2.0050	7 24 54.2	12.048
9	2 3 54.07	2.0045	7 36 55.7	12.001
10	2 5 54.33	2.0041	7 48 54.3	11.952
11	2 7 54.57	2.0037	8 0 50.0	11.903
12	2 9 54.78	2.0034	8 12 42.7	11.853
13	2 11 54.98	2.0032	8 24 32.4	11.803
14	2 13 55.17	2.0030	8 36 19.0	11.752
15	2 15 55.34	2.0028	8 48 2.6	11.700
16	2 17 55.51	2.0027	8 59 43.0	11.647
17	2 19 55.67	2.0027	9 11 20.2	11.593
18	2 21 55.83	2.0027	9 22 54.1	11.538
19	2 23 55.99	2.0027	9 34 24.7	11.483
20	2 25 56.15	2.0027	9 45 52.0	11.426
21	2 27 56.31	2.0027	9 57 16.0	11.372
22	2 29 56.48	2.0028	10 8 36.6	11.314
23	2 31 56.65	2.0030	10 19 53.7	11.255
24	2 33 56.84	2.0033	N. 10 31 7.2	11.196

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 13.					**SUNDAY 15.**				
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	2 33 56.84	2.0033	N.10 31 7.2	11.196	0	4 11 1.14	2.0519	N.18 8 54.1	7.656
1	2 35 57.05	2.0036	10 42 17.2	11.137	1	4 13 4.30	2.0535	18 16 30.9	7.569
2	2 37 57.27	2.0039	10 53 23.6	11.077	2	4 15 7.56	2.0551	18 24 2.4	7.481
3	2 39 57.51	2.0042	11 4 26.5	11.017	3	4 17 10.91	2.0567	18 31 28.6	7.392
4	2 41 57.77	2.0046	11 15 25.7	10.955	4	4 19 14.36	2.0582	18 38 49.5	7.304
5	2 43 58.06	2.0050	11 26 21.1	10.892	5	4 21 17.90	2.0598	18 46 5.1	7.216
6	2 45 58.37	2.0054	11 37 12.8	10.830	6	4 23 21.54	2.0615	18 53 15.4	7.127
7	2 47 58.71	2.0059	11 48 0.7	10.767	7	4 25 25.28	2.0631	19 0 20.3	7.037
8	2 49 59.08	2.0065	11 58 44.8	10.703	8	4 27 29.11	2.0647	19 7 19.8	6.947
9	2 51 59.49	2.0071	12 9 25.0	10.638	9	4 29 33.04	2.0663	19 14 13.9	6.856
10	2 53 59.93	2.0077	12 20 1.4	10.573	10	4 31 37.07	2.0679	19 21 2.5	6.764
11	2 56 0.41	2.0083	12 30 33.8	10.507	11	4 33 41.19	2.0695	19 27 45.6	6.673
12	2 58 0.92	2.0089	12 41 2.2	10.440	12	4 35 45.41	2.0712	19 34 23.3	6.582
13	3 0 1.48	2.0096	12 51 26.6	10.372	13	4 37 49.73	2.0728	19 40 55.4	6.489
14	3 2 2.08	2.0104	13 1 46.9	10.304	14	4 39 54.15	2.0745	19 47 21.9	6.396
15	3 4 2.73	2.0112	13 12 3.1	10.236	15	4 41 58.67	2.0761	19 53 42.9	6.302
16	3 6 3.43	2.0121	13 22 15.2	10.167	16	4 44 3.29	2.0777	19 59 58.2	6.208
17	3 8 4.18	2.0128	13 32 23.2	10.098	17	4 46 8.00	2.0793	20 6 7.9	6.114
18	3 10 4.97	2.0137	13 42 27.0	10.027	18	4 48 12.81	2.0810	20 12 11.9	6.019
19	3 12 5.82	2.0147	13 52 26.5	9.956	19	4 50 17.72	2.0827	20 18 10.2	5.924
20	3 14 6.73	2.0156	14 2 21.7	9.884	20	4 52 22.73	2.0843	20 24 2.8	5.829
21	3 16 7.69	2.0165	14 12 12.6	9.812	21	4 54 27.84	2.0859	20 29 49.7	5.733
22	3 18 8.71	2.0176	14 21 59.2	9.740	22	4 56 33.04	2.0875	20 35 30.8	5.637
23	3 20 9.80	2.0187	N.14 31 41.4	9.666	23	4 58 38.34	2.0891	N.20 41 6.1	5.541
SATURDAY 14.					**MONDAY 16.**				
0	3 22 10.95	2.0197	N.14 41 19.1	9.592	0	5 0 43.74	2.0907	N.20 46 35.7	5.444
1	3 24 12.16	2.0208	14 50 52.4	9.517	1	5 2 49.23	2.0923	20 51 59.4	5.346
2	3 26 13.44	2.0219	15 0 21.2	9.442	2	5 4 54.82	2.0940	20 57 17.2	5.249
3	3 28 14.79	2.0230	15 9 45.5	9.367	3	5 7 0.51	2.0956	21 2 29.2	5.151
4	3 30 16.20	2.0242	15 19 5.3	9.291	4	5 9 6.29	2.0972	21 7 35.3	5.052
5	3 32 17.69	2.0254	15 28 20.5	9.214	5	5 11 12.17	2.0988	21 12 35.4	4.952
6	3 34 19.25	2.0266	15 37 31.0	9.137	6	5 13 18.15	2.1004	21 17 29.6	4.853
7	3 36 20.88	2.0278	15 46 36.9	9.059	7	5 15 24.22	2.1019	21 22 17.8	4.753
8	3 38 22.59	2.0291	15 55 38.1	8.981	8	5 17 30.38	2.1034	21 27 0.0	4.654
9	3 40 24.38	2.0304	16 4 34.6	8.902	9	5 19 36.63	2.1049	21 31 36.3	4.554
10	3 42 26.24	2.0317	16 13 26.3	8.822	10	5 21 42.97	2.1064	21 36 6.5	4.453
11	3 44 28.18	2.0330	16 22 13.2	8.742	11	5 23 49.40	2.1080	21 40 30.7	4.352
12	3 46 30.20	2.0343	16 30 55.4	8.662	12	5 25 55.93	2.1095	21 44 48.8	4.251
13	3 48 32.30	2.0357	16 39 32.7	8.581	13	5 28 2.54	2.1109	21 49 0.8	4.149
14	3 50 34.49	2.0372	16 48 5.1	8.499	14	5 30 9.24	2.1124	21 53 6.7	4.048
15	3 52 36.76	2.0386	16 56 32.6	8.417	15	5 32 16.03	2.1139	21 57 6.5	3.946
16	3 54 39.12	2.0400	17 4 55.1	8.334	16	5 34 22.91	2.1153	22 1 0.2	3.843
17	3 56 41.56	2.0414	17 13 12.7	8.251	17	5 36 29.87	2.1167	22 4 47.7	3.740
18	3 58 44.09	2.0429	17 21 25.3	8.167	18	5 38 36.91	2.1180	22 8 29.0	3.637
19	4 0 46.71	2.0444	17 29 32.8	8.083	19	5 40 44.03	2.1194	22 12 4.1	3.533
20	4 2 49.42	2.0458	17 37 35.3	7.999	20	5 42 51.24	2.1208	22 15 33.0	3.430
21	4 4 52.21	2.0473	17 45 32.7	7.914	21	5 44 58.53	2.1222	22 18 55.7	3.326
22	4 6 55.09	2.0488	17 53 25.0	7.828	22	5 47 5.90	2.1235	22 22 12.1	3.222
23	4 8 58.07	2.0504	18 1 12.1	7.742	23	5 49 13.35	2.1247	22 25 22.3	3.117
24	4 11 1.14	2.0519	N.18 8 54.1	7.656	24	5 51 20.87	2.1260	N.22 28 26.2	3.012

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	TUESDAY 17.					**THURSDAY 19.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	5 51 20.87	2.1260	N.22 28 26.2	3.012	0	7 34 19.80	2.1528	N.22 48 48.4	2.202
1	5 53 28.47	2.1272	22 31 23.8	2.907	1	7 36 28.96	2.1526	22 46 33.0	2.311
2	5 55 36.14	2.1285	22 34 15.1	2.802	2	7 38 38.11	2.1523	22 44 11.1	2.420
3	5 57 43.89	2.1297	22 37 0.0	2.696	3	7 40 47.24	2.1520	22 41 42.6	2.530
4	5 59 51.71	2.1308	22 39 38.6	2.591	4	7 42 56.35	2.1517	22 39 7.5	2.639
5	6 1 59.59	2.1319	22 42 10.9	2.485	5	7 45 5.44	2.1513	22 36 25.9	2.748
6	6 4 7.54	2.1331	22 44 36.8	2.378	6	7 47 14.51	2.1509	22 33 37.8	2.857
7	6 6 15.56	2.1342	22 46 56.3	2.272	7	7 49 23.55	2.1505	22 30 43.1	2.966
8	6 8 23.64	2.1352	22 49 9.4	2.165	8	7 51 32.57	2.1501	22 27 41.9	3.074
9	6 10 31.79	2.1363	22 51 16.1	2.058	9	7 53 41.56	2.1496	22 24 34.2	3.183
10	6 12 40.00	2.1373	22 53 16.4	1.951	10	7 55 50.52	2.1490	22 21 19.9	3.292
11	6 14 48.27	2.1383	22 55 10.3	1.844	11	7 57 59.44	2.1484	22 17 59.1	3.400
12	6 16 56.60	2.1393	22 56 57.7	1.736	12	8 0 8.33	2.1478	22 14 31.9	3.508
13	6 19 4.99	2.1402	22 58 38.6	1.628	13	8 2 17.18	2.1472	22 10 58.2	3.616
14	6 21 13.43	2.1411	23 0 13.1	1.521	14	8 4 25.99	2.1466	22 7 18.0	3.724
15	6 23 21.92	2.1420	23 1 41.1	1.412	15	8 6 34.77	2.1460	22 3 31.3	3.831
16	6 25 30.47	2.1429	23 3 2.6	1.304	16	8 8 43.51	2.1453	21 59 38.2	3.938
17	6 27 39.07	2.1437	23 4 17.6	1.196	17	8 10 52.20	2.1445	21 55 38.7	4.045
18	6 29 47.71	2.1444	23 5 26.2	1.088	18	8 13 0.85	2.1437	21 51 32.8	4.152
19	6 31 56.40	2.1452	23 6 28.2	0.979	19	8 15 9.45	2.1429	21 47 20.5	4.258
20	6 34 5.13	2.1459	23 7 23.7	0.871	20	8 17 18.00	2.1422	21 43 1.8	4.365
21	6 36 13.91	2.1467	23 8 12.7	0.762	21	8 19 26.51	2.1414	21 38 36.7	4.471
22	6 38 22.73	2.1473	23 8 55.1	0.652	22	8 21 34.97	2.1405	21 34 5.2	4.577
23	6 40 31.59	2.1479	N.23 9 31.0	0.543	23	8 23 43.37	2.1396	N.21 29 27.4	4.682
	WEDNESDAY 18.					**FRIDAY 20.**			
0	6 42 40.48	2.1485	N.23 10 0.3	0.434	0	8 25 51.72	2.1387	N.21 24 43.3	4.788
1	6 44 49.41	2.1491	23 10 23.1	0.325	1	8 28 0.01	2.1377	21 19 52.8	4.893
2	6 46 58.37	2.1496	23 10 39.3	0.215	2	8 30 8.25	2.1368	21 14 56.1	4.998
3	6 49 7.36	2.1501	23 10 48.9	+ 0.105	3	8 32 16.43	2.1358	21 9 53.1	5.103
4	6 51 16.38	2.1506	23 10 51.9	− 0.004	4	8 34 24.55	2.1348	21 4 43.8	5.207
5	6 53 25.43	2.1510	23 10 48.4	0.113	5	8 36 32.61	2.1338	20 59 28.3	5.310
6	6 55 34.50	2.1514	23 10 38.3	0.223	6	8 38 40.61	2.1327	20 54 6.6	5.413
7	6 57 43.59	2.1518	23 10 21.6	0.333	7	8 40 48.54	2.1317	20 48 38.7	5.516
8	6 59 52.71	2.1522	23 9 58.3	0.443	8	8 42 56.41	2.1307	20 43 4.6	5.619
9	7 2 1.85	2.1525	23 9 28.4	0.553	9	8 45 4.22	2.1296	20 37 24.4	5.722
10	7 4 11.01	2.1527	23 8 51.9	0.663	10	8 47 11.96	2.1284	20 31 38.0	5.825
11	7 6 20.18	2.1529	23 8 8.8	0.773	11	8 49 19.63	2.1273	20 25 45.4	5.927
12	7 8 29.36	2.1531	23 7 19.1	0.883	12	8 51 27.24	2.1262	20 19 46.7	6.028
13	7 10 38.55	2.1532	23 6 22.8	0.993	13	8 53 34.78	2.1251	20 13 42.0	6.129
14	7 12 47.75	2.1534	23 5 19.9	1.103	14	8 55 42.25	2.1239	20 7 31.2	6.230
15	7 14 56.96	2.1535	23 4 10.4	1.213	15	8 57 49.64	2.1226	20 1 14.4	6.330
16	7 17 6.17	2.1536	23 2 54.3	1.323	16	8 59 56.96	2.1214	19 54 51.6	6.430
17	7 19 15.39	2.1537	23 1 31.6	1.432	17	9 2 4.21	2.1202	19 48 22.8	6.529
18	7 21 24.61	2.1536	23 0 2.4	1.542	18	9 4 11.39	2.1190	19 41 48.1	6.628
19	7 23 33.82	2.1535	22 58 26.5	1.653	19	9 6 18.49	2.1177	19 35 7.4	6.727
20	7 25 43.03	2.1535	22 56 44.0	1.762	20	9 8 25.52	2.1165	19 28 20.8	6.825
21	7 27 52.24	2.1534	22 54 55.0	1.872	21	9 10 32.47	2.1152	19 21 28.4	6.922
22	7 30 1.44	2.1532	22 52 59.4	1.982	22	9 12 39.35	2.1140	19 14 30.1	7.020
23	7 32 10.63	2.1530	22 50 57.2	2.092	23	9 14 46.15	2.1127	19 7 26.0	7.118
24	7 34 19.80	2.1528	N.22 48 48.4	2.202	24	9 16 52.87	2.1114	N.19 0 16.0	7.214

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	SATURDAY 21.					**MONDAY 23.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	9 16 52.87	2.1114	N.19 0 16.0	7.214	0	10 56 46.31	2.0550	N.11 33 28.9	11.155
1	9 18 59.51	2.1101	18 53 0.3	7.309	1	10 58 49.59	2.0542	11 22 17.6	11.220
2	9 21 6.08	2.1088	18 45 38.9	7.405	2	11 0 52.82	2.0535	11 11 2.5	11.284
3	9 23 12.57	2.1075	18 38 11.7	7.501	3	11 2 56.01	2.0528	10 59 43.6	11.347
4	9 25 18.98	2.1062	18 30 38.8	7.595	4	11 4 59.15	2.0521	10 48 20.9	11.410
5	9 27 25.31	2.1048	18 23 0.3	7.689	5	11 7 2.26	2.0515	10 36 54.4	11.472
6	9 29 31.56	2.1035	18 15 16.2	7.782	6	11 9 5.33	2.0508	10 25 24.3	11.532
7	9 31 37.73	2.1022	18 7 26.5	7.875	7	11 11 8.36	2.0502	10 13 50.6	11.592
8	9 33 43.82	2.1008	17 59 31.2	7.967	8	11 13 11.36	2.0497	10 2 13.3	11.652
9	9 35 49.83	2.0995	17 51 30.4	8.059	9	11 15 14.33	2.0492	9 50 32.4	11.710
10	9 37 55.76	2.0982	17 43 24.1	8.151	10	11 17 17.27	2.0487	9 38 48.1	11.767
11	9 40 1.61	2.0969	17 35 12.3	8.242	11	11 19 20.18	2.0483	9 27 0.4	11.823
12	9 42 7.39	2.0956	17 26 55.1	8.332	12	11 21 23.07	2.0480	9 15 9.3	11.879
13	9 44 13.09	2.0942	17 18 32.5	8.422	13	11 23 25.94	2.0476	9 3 14.9	11.934
14	9 46 18.70	2.0928	17 10 4.5	8.511	14	11 25 28.78	2.0472	8 51 17.2	11.987
15	9 48 24.23	2.0915	17 1 31.2	8.599	15	11 27 31.60	2.0469	8 39 16.4	12.040
16	9 50 29.68	2.0902	16 52 52.6	8.687	16	11 29 34.41	2.0467	8 27 12.4	12.092
17	9 52 35.06	2.0890	16 44 8.7	8.775	17	11 31 37.20	2.0464	8 15 5.3	12.143
18	9 54 40.36	2.0877	16 35 19.6	8.862	18	11 33 39.98	2.0462	8 2 55.2	12.193
19	9 56 45.58	2.0864	16 26 25.3	8.948	19	11 35 42.75	2.0461	7 50 42.1	12.242
20	9 58 50.72	2.0851	16 17 25.9	9.034	20	11 37 45.51	2.0460	7 38 26.1	12.291
21	10 0 55.79	2.0838	16 8 21.3	9.119	21	11 39 48.27	2.0459	7 26 7.2	12.338
22	10 3 0.78	2.0825	15 59 11.6	9.203	22	11 41 51.02	2.0458	7 13 45.5	12.385
23	10 5 5.69	2.0812	N.15 49 56.9	9.286	23	11 43 53.77	2.0458	N. 7 1 21.0	12.431
	SUNDAY 22.					**TUESDAY 24.**			
0	10 7 10.53	2.0800	N.15 40 37.2	9.369	0	11 45 56.52	2.0459	N. 6 48 53.8	12.475
1	10 9 15.29	2.0788	15 31 12.6	9.452	1	11 47 59.28	2.0460	6 36 24.0	12.518
2	10 11 19.98	2.0776	15 21 43.0	9.534	2	11 50 2.04	2.0461	6 23 51.6	12.561
3	10 13 24.60	2.0763	15 12 8.5	9.616	3	11 52 4.81	2.0463	6 11 16.6	12.603
4	10 15 29.14	2.0751	15 2 29.1	9.696	4	11 54 7.60	2.0466	5 58 39.2	12.643
5	10 17 33.61	2.0739	14 52 45.0	9.775	5	11 56 10.40	2.0469	5 45 59.4	12.682
6	10 19 38.01	2.0727	14 42 56.1	9.854	6	11 58 13.22	2.0472	5 33 17.3	12.721
7	10 21 42.34	2.0716	14 33 2.5	9.933	7	12 0 16.06	2.0475	5 20 32.9	12.759
8	10 23 46.60	2.0704	14 23 4.2	10.011	8	12 2 18.92	2.0479	5 7 46.2	12.796
9	10 25 50.79	2.0693	14 13 1.2	10.088	9	12 4 21.81	2.0483	4 54 57.4	12.831
10	10 27 54.92	2.0682	14 2 53.6	10.164	10	12 6 24.72	2.0488	4 42 6.5	12.866
11	10 29 58.98	2.0671	13 52 41.5	10.240	11	12 8 27.67	2.0494	4 29 13.5	12.900
12	10 32 2.97	2.0660	13 42 24.8	10.316	12	12 10 30.65	2.0499	4 16 18.5	12.932
13	10 34 6.90	2.0650	13 32 3.6	10.389	13	12 12 33.66	2.0505	4 3 21.6	12.964
14	10 36 10.77	2.0640	13 21 38.1	10.462	14	12 14 36.71	2.0512	3 50 22.8	12.994
15	10 38 14.58	2.0629	13 11 8.2	10.535	15	12 16 39.81	2.0520	3 37 22.3	13.023
16	10 40 18.32	2.0619	13 0 33.9	10.607	16	12 18 42.95	2.0528	3 24 20.1	13.051
17	10 42 22.01	2.0610	12 49 55.3	10.678	17	12 20 46.14	2.0536	3 11 16.2	13.079
18	10 44 25.64	2.0600	12 39 12.5	10.748	18	12 22 49.38	2.0544	2 58 10.6	13.106
19	10 46 29.21	2.0591	12 28 25.5	10.818	19	12 24 52.67	2.0553	2 45 3.5	13.131
20	10 48 32.73	2.0582	12 17 34.3	10.887	20	12 26 56.02	2.0563	2 31 54.9	13.154
21	10 50 36.20	2.0574	12 6 39.0	10.956	21	12 28 59.43	2.0573	2 18 45.0	13.177
22	10 52 39.62	2.0566	11 55 39.6	11.023	22	12 31 2.90	2.0583	2 5 33.7	13.199
23	10 54 42.99	2.0558	11 44 36.2	11.089	23	12 33 6.43	2.0594	1 52 21.1	13.219
24	10 56 46.31	2.0550	N.11 33 28.9	11.155	24	12 35 10.03	2.0606	N. 1 39 7.4	13.238

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

WEDNESDAY 25.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	12 35 10.03	2.0606	N. 1 39 7.4	13.238
1	12 37 13.70	2.0618	1 25 52.5	13.257
2	12 39 17.45	2.0631	1 12 36.5	13.275
3	12 41 21.27	2.0644	0 59 19.5	13.292
4	12 43 25.17	2.0658	0 46 1.5	13.307
5	12 45 29.16	2.0672	0 32 42.7	13.320
6	12 47 33.23	2.0686	0 19 23.1	13.333
7	12 49 37.39	2.0701	N. 0 6 2.7	13.345
8	12 51 41.64	2.0717	S. 0 7 18.3	13.355
9	12 53 45.99	2.0733	0 20 39.9	13.364
10	12 55 50.44	2.0750	0 34 2.0	13.372
11	12 57 54.99	2.0767	0 47 24.6	13.380
12	12 59 59.64	2.0784	1 0 47.6	13.386
13	13 2 4.40	2.0802	1 14 10.9	13.390
14	13 4 9.27	2.0821	1 27 34.4	13.393
15	13 6 14.25	2.0840	1 40 58.1	13.396
16	13 8 19.35	2.0860	1 54 21.9	13.397
17	13 10 24.57	2.0881	2 7 45.7	13.396
18	13 12 29.92	2.0902	2 21 9.4	13.394
19	13 14 35.39	2.0923	2 34 33.0	13.392
20	13 16 40.99	2.0945	2 47 56.5	13.389
21	13 18 46.73	2.0967	3 1 19.7	13.384
22	13 20 52.60	2.0990	3 14 42.6	13.377
23	13 22 58.61	2.1013	S. 3 28 5.0	13.369

THURSDAY 26.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	13 25 4.76	2.1037	S. 3 41 26.9	13.361
1	13 27 11.06	2.1062	3 54 48.3	13.351
2	13 29 17.50	2.1086	4 8 9.0	13.339
3	13 31 24.09	2.1112	4 21 29.0	13.327
4	13 33 30.84	2.1138	4 34 48.2	13.313
5	13 35 37.75	2.1165	4 48 6.5	13.298
6	13 37 44.82	2.1192	5 1 23.9	13.282
7	13 39 52.05	2.1219	5 14 40.3	13.264
8	13 41 59.45	2.1247	5 27 55.6	13.244
9	13 44 7.02	2.1276	5 41 9.6	13.223
10	13 46 14.76	2.1305	5 54 22.4	13.202
11	13 48 22.68	2.1335	6 7 33.9	13.180
12	13 50 30.78	2.1366	6 20 44.0	13.156
13	13 52 39.06	2.1397	6 33 52.6	13.130
14	13 54 47.53	2.1427	6 46 59.6	13.102
15	13 56 56.18	2.1458	7 0 4.9	13.074
16	13 59 5.02	2.1490	7 13 8.5	13.045
17	14 1 14.06	2.1522	7 26 10.3	13.015
18	14 3 23.29	2.1555	7 39 10.3	12.983
19	14 5 32.72	2.1589	7 52 8.3	12.949
20	14 7 42.36	2.1623	8 5 4.2	12.913
21	14 9 52.20	2.1657	8 17 57.9	12.877
22	14 12 2.25	2.1692	8 30 49.4	12.840
23	14 14 12.51	2.1727	8 43 38.7	12.802
24	14 16 22.98	2.1763	S. 8 56 25.6	12.761

FRIDAY 27.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	14 16 22.98	2.1763	S. 8 56 25.6	12.761
1	14 18 33.67	2.1800	9 9 10.0	12.719
2	14 20 44.58	2.1836	9 21 51.9	12.677
3	14 22 55.70	2.1873	9 34 31.2	12.633
4	14 25 7.05	2.1911	9 47 7.8	12.587
5	14 27 18.63	2.1949	9 59 41.6	12.539
6	14 29 30.44	2.1987	10 12 12.5	12.491
7	14 31 42.48	2.2026	10 24 40.5	12.441
8	14 33 54.75	2.2065	10 37 5.4	12.389
9	14 36 7.26	2.2104	10 49 27.2	12.337
10	14 38 20.00	2.2144	11 1 45.8	12.283
11	14 40 32.99	2.2185	11 14 1.1	12.228
12	14 42 46.22	2.2226	11 26 13.1	12.172
13	14 44 59.70	2.2267	11 38 21.7	12.113
14	14 47 13.42	2.2308	11 50 26.7	12.052
15	14 49 27.39	2.2350	12 2 28.0	11.991
16	14 51 41.62	2.2392	12 14 25.6	11.929
17	14 53 56.10	2.2434	12 26 19.5	11.866
18	14 56 10.83	2.2477	12 38 9.5	11.800
19	14 58 25.82	2.2520	12 49 55.5	11.733
20	15 0 41.07	2.2563	13 1 37.5	11.666
21	15 2 56.58	2.2607	13 13 15.4	11.597
22	15 5 12.35	2.2650	13 24 49.1	11.526
23	15 7 28.38	2.2694	S. 13 36 18.5	11.453

SATURDAY 28.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	15 9 44.68	2.2739	S. 13 47 43.5	11.380
1	15 12 1.25	2.2784	13 59 4.1	11.305
2	15 14 18.09	2.2828	14 10 20.1	11.228
3	15 16 35.19	2.2873	14 21 31.5	11.151
4	15 18 52.56	2.2918	14 32 38.2	11.072
5	15 21 10.21	2.2964	14 43 40.1	10.992
6	15 23 28.13	2.3009	14 54 37.2	10.910
7	15 25 46.32	2.3055	15 5 29.3	10.827
8	15 28 4.79	2.3102	15 16 16.4	10.742
9	15 30 23.54	2.3148	15 26 58.3	10.655
10	15 32 42.56	2.3194	15 37 35.0	10.567
11	15 35 1.86	2.3240	15 48 6.4	10.479
12	15 37 21.44	2.3286	15 58 32.5	10.389
13	15 39 41.30	2.3332	16 8 53.1	10.297
14	15 42 1.43	2.3378	16 19 8.2	10.204
15	15 44 21.84	2.3425	16 29 17.6	10.109
16	15 46 42.53	2.3471	16 39 21.3	10.014
17	15 49 3.50	2.3517	16 49 19.3	9.918
18	15 51 24.74	2.3563	16 59 11.5	9.820
19	15 53 46.26	2.3610	17 8 57.7	9.719
20	15 56 8.06	2.3657	17 18 37.8	9.618
21	15 58 30.14	2.3703	17 28 11.9	9.517
22	16 0 52.50	2.3750	17 37 39.8	9.413
23	16 3 15.14	2.3796	17 47 1.4	9.307
24	16 5 38.05	2.3842	S. 17 56 16.6	9.200

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	SUNDAY 29.			
	h m s	s	° ′ ″	″
0	16 5 38.05	2.3842	S.17 56 16.6	9.200
1	16 8 1.24	2.3887	18 5 25.4	9.093
2	16 10 24.70	2.3933	18 14 27.8	8.985
3	16 12 48.44	2.3979	18 23 23.6	8.874
4	16 15 12.45	2.4024	18 32 12.7	8.762
5	16 17 36.73	2.4069	18 40 55.1	8.650
6	16 20 1.28	2.4114	18 49 30.7	8.536
7	16 22 26.10	2.4159	18 57 59.4	8.421
8	16 24 51.19	2.4203	19 6 21.2	8.304
9	16 27 16.54	2.4247	19 14 35.9	8.186
10	16 29 42.15	2.4291	19 22 43.5	8.067
11	16 32 8.03	2.4335	19 30 44.0	7.948
12	16 34 34.17	2.4378	19 38 37.3	7.827
13	16 37 0.56	2.4420	19 46 23.3	7.704
14	16 39 27.21	2.4463	19 54 1.8	7.580
15	16 41 54.12	2.4506	20 1 32.9	7.456
16	16 44 21.28	2.4547	20 8 56.5	7.330
17	16 46 48.68	2.4587	20 16 12.5	7.202
18	16 49 16.33	2.4628	20 23 20.8	7.074
19	16 51 44.22	2.4668	20 30 21.4	6.945
20	16 54 12.35	2.4708	20 37 14.2	6.815
21	16 56 40.72	2.4747	20 43 59.2	6.684
22	16 59 9.32	2.4786	20 50 36.3	6.552
23	17 1 38.15	2.4824	S.20 57 5.4	6.418
	MONDAY 30.			
0	17 4 7.20	2.4861	S.21 3 26.5	6.284
1	17 6 36.48	2.4898	21 9 39.5	6.148
2	17 9 5.98	2.4934	21 15 44.3	6.012
3	17 11 35.69	2.4969	21 21 40.9	5.875
4	17 14 5.61	2.5004	21 27 29.3	5.737
5	17 16 35.74	2.5039	21 33 9.3	5.597
6	17 19 6.08	2.5072	21 38 40.9	5.457
7	17 21 36.61	2.5105	21 44 4.1	5.316
8	17 24 7.34	2.5137	21 49 18.8	5.173
9	17 26 38.26	2.5169	21 54 24.9	5.030
10	17 29 9.37	2.5199	21 59 22.4	4.887
11	17 31 40.65	2.5228	22 4 11.4	4.744
12	17 34 12.11	2.5257	22 8 51.7	4.598
13	17 36 43.74	2.5286	22 13 23.2	4.452
14	17 39 15.54	2.5313	22 17 45.9	4.306
15	17 41 47 50	2.5340	22 21 59.9	4.159
16	17 44 19.62	2.5365	22 26 5.0	4.011
17	17 46 51.88	2.5389	22 30 1.2	3.862
18	17 49 24.29	2.5413	22 33 48.4	3.712
19	17 51 56.84	2.5437	22 37 26.7	3.562
20	17 54 29.53	2.5459	22 40 55.9	3.412
21	17 57 2.35	2.5480	22 44 16.1	3.261
22	17 59 35.29	2.5499	22 47 27.2	3.109
23	18 2 8.34	2.5518	22 50 29.2	2.957
24	18 4 41.50	2.5536	S.22 53 22.1	2.805

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	TUESDAY, OCTOBER 1.			
	h m s	s	° ′ ″	″
0	18 4 41.50	2.5536	S.22 53 22.1	2.805

PHASES OF THE MOON.

		d	h	m
☽ First Quarter	. Sept.	2	7	34.6
○ Full Moon	. . . .	9	1	52.6
☾ Last Quarter	. . . .	16	16	48.7
● New Moon	. . . .	24	14	41.7

		d	h
☾ Perigee. . .	. Sept.	5	13.2
☾ Apogee.		17	12.7

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	**Sun**	W.	72° 57′ 50″	2716	74° 34′ 8″	2708	76° 10′ 37″	2701	77° 47′ 16″	2693
	Spica	W.	30 22 44	2512	32 3 40	2494	33 45 2	2477	35 26 48	2460
	Jupiter	E.	36 33 57	2397	34 50 18	2390	33 6 29	2383	31 22 30	2376
	α Aquilæ	E.	69 5 8	3180	67 38 35	3193	66 12 18	3209	64 46 19	3225
	Fomalhaut	E.	100 51 50	2590	99 12 41	2580	97 33 19	2572	95 53 45	2563
2	**Sun**	W.	85 53 3	2655	87 30 43	2649	89 8 32	2641	90 46 31	2635
	Spica	W.	44 0 41	2398	45 44 19	2387	47 28 12	2377	49 12 20	2367
	α Aquilæ	E.	57 42 30	3354	56 19 21	3391	54 56 54	3431	53 35 13	3478
	Fomalhaut	E.	87 33 12	2527	85 52 37	2522	84 11 54	2516	82 31 3	2511
	α Pegasi	E.	103 58 39	2756	102 23 14	2744	100 47 33	2732	99 11 36	2722
3	**Sun**	W.	98 58 43	2601	100 37 36	2596	102 16 37	2590	103 55 46	2584
	Spica	W.	57 56 17	2325	59 41 40	2317	61 27 14	2311	63 12 58	2304
	α Aquilæ	E.	47 1 38	3803	45 46 39	3895	44 33 14	3997	43 21 31	4112
	Fomalhaut	E.	74 5 20	2494	72 23 59	2492	70 42 35	2492	69 1 10	2492
	α Pegasi	E.	91 8 42	2681	89 31 37	2675	87 54 24	2671	86 17 5	2666
4	**Sun**	W.	112 13 21	2559	113 53 12	2555	115 33 9	2551	117 13 11	2548
	Spica	W.	72 4 1	2274	73 50 39	2269	75 37 24	2264	77 24 16	2260
	Antares	W.	26 34 31	2407	28 17 56	2384	30 1 54	2364	31 46 20	2348
	Fomalhaut	E.	60 34 28	2505	58 53 22	2511	57 12 24	2517	55 31 35	2526
	α Pegasi	E.	78 9 33	2661	76 32 1	2663	74 54 31	2666	73 17 6	2671
5	**Sun**	W.	125 34 26	2535	127 14 50	2534	128 55 16	2534	130 35 42	2533
	Spica	W.	86 20 4	2243	88 7 27	2241	89 54 54	2239	91 42 23	2238
	Antares	W.	40 33 39	2291	42 19 52	2283	44 6 17	2277	45 52 51	2271
	Jupiter	W.	20 1 50	2227	21 49 37	2224	23 37 29	2221	25 25 25	2220
	Fomalhaut	E.	47 11 28	2601	45 32 34	2624	43 54 12	2651	42 16 26	2681
	α Pegasi	E.	65 12 7	2715	63 35 47	2729	61 59 45	2744	60 24 4	2763
6	Antares	W.	54 47 21	2254	56 34 28	2253	58 21 37	2253	60 8 46	2253
	Jupiter	W.	34 25 30	2217	36 13 32	2218	38 1 33	2219	39 49 32	2221
	Fomalhaut	E.	34 20 6	2924	32 48 18	2999	31 18 4	3086	29 49 40	3193
	α Pegasi	E.	52 32 44	2895	51 0 19	2933	49 28 42	2974	47 57 57	3021
	α Arietis	E.	93 22 0	2344	91 37 5	2345	89 52 11	2347	88 7 20	2349
7	Antares	W.	69 4 15	2262	70 51 11	2265	72 38 2	2268	74 24 48	2272
	Jupiter	W.	48 48 36	2235	50 36 11	2240	52 23 39	2245	54 10 59	2251
	α Arietis	E.	79 24 4	2369	77 39 45	2375	75 55 34	2382	74 11 33	2390
	Aldebaran	E.	110 20 59	2228	108 33 13	2232	106 45 33	2237	104 58 0	2242
8	Antares	W.	83 16 43	2304	85 2 37	2311	86 48 20	2320	88 33 51	2328
	Jupiter	W.	63 5 31	2283	64 51 55	2291	66 38 8	2300	68 24 8	2309
	α Aquilæ	W.	44 59 9	3854	46 13 16	3768	47 28 51	3693	48 45 45	3626
	α Arietis	E.	65 34 42	2442	63 52 7	2455	62 9 50	2470	60 27 54	2485
	Aldebaran	E.	96 2 22	2274	94 15 45	2282	92 29 19	2290	90 43 5	2299
9	**Jupiter**	W.	77 10 43	2359	78 55 17	2370	80 39 35	2381	82 23 37	2394
	α Aquilæ	W.	55 25 47	3395	56 48 9	3365	58 11 6	3338	59 34 33	3316
	α Arietis	E.	52 4 3	2578	50 24 38	2601	48 45 45	2627	47 7 27	2655
	Aldebaran	E.	81 55 18	2348	80 10 29	2359	78 25 56	2371	76 41 40	2383

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ′ ″		° ′ ″		° ′ ″		° ′ ″	
1	Sun	W.	79 24 5	2686	81 1 4	2678	82 38 13	2670	84 15 33	2663
	Spica	W.	37 8 57	2446	38 51 26	2433	40 34 14	2421	42 17 19	2409
	Jupiter	E.	29 38 21	2369	27 54 2	2363	26 9 34	2357	24 24 57	2350
	α Aquilæ	E.	63 20 40	3245	61 55 24	3268	60 30 35	3294	59 6 16	3322
	Fomalhaut	E.	94 13 59	2555	92 34 2	2548	90 53 55	2540	89 13 38	2534
2	Sun	W.	92 24 39	2628	94 2 56	2621	95 41 23	2614	97 19 59	2608
	Spica	W.	50 56 42	2358	52 41 17	2349	54 26 5	2341	56 11 5	2333
	α Aquilæ	E.	52 14 24	3529	50 54 32	3586	49 35 42	3650	48 18 2	3722
	Fomalhaut	E.	80 50 5	2507	79 9 1	2503	77 27 52	2499	75 46 38	2497
	α Pegasi	E.	97 35 25	2712	95 59 1	2703	94 22 25	2695	92 45 38	2688
3	Sun	W.	105 35 3	2579	107 14 27	2574	108 53 58	2569	110 33 36	2564
	Spica	W.	64 58 52	2297	66 44 56	2291	68 31 9	2285	70 17 31	2279
	α Aquilæ	E.	42 11 41	4243	41 3 55	4390	39 58 25	4558	38 55 24	4748
	Fomalhaut	E.	67 19 45	2492	65 38 21	2494	63 56 59	2497	62 15 41	2500
	α Pegasi	E.	84 39 40	2663	83 2 11	2661	81 24 39	2660	79 47 6	2660
4	Sun	W.	118 53 18	2545	120 33 29	2541	122 13 45	2539	123 54 4	2537
	Spica	W.	79 11 15	2256	80 58 20	2252	82 45 30	2249	84 32 45	2246
	Antares	W.	33 31 10	2333	35 16 21	2320	37 1 51	2309	38 47 38	2299
	Fomalhaut	E.	53 50 58	2537	52 10 36	2550	50 30 32	2564	48 50 48	2582
	α Pegasi	E.	71 39 47	2676	70 2 35	2684	68 25 33	2692	66 48 43	2703
5	Sun	W.	132 16 9	2534	133 56 35	2535	135 37 0	2536	137 17 23	2538
	Spica	W.	93 29 54	2237	95 17 26	2237	97 4 59	2236	98 52 33	2236
	Antares	W.	47 39 33	2266	49 26 22	2262	51 13 17	2259	53 0 17	2256
	Jupiter	W.	27 13 23	2218	29 1 23	2217	30 49 25	2216	32 37 28	2217
	Fomalhaut	E.	40 39 21	2716	39 3 3	2757	37 27 39	2805	35 53 17	2859
	α Pegasi	E.	58 48 47	2783	57 13 57	2806	55 39 37	2832	54 5 51	2862
6	Antares	W.	61 55 55	2253	63 43 3	2254	65 30 10	2256	67 17 14	2258
	Jupiter	W.	41 37 28	2223	43 25 21	2225	45 13 11	2229	47 0 56	2232
	Fomalhaut	E.	28 23 23	3319	26 59 33	3470	25 38 35	3652	24 20 57	3874
	α Pegasi	E.	46 28 10	3073	44 59 28	3133	43 31 58	3199	42 5 48	3273
	α Arietis	E.	86 22 32	2351	84 37 47	2354	82 53 6	2358	81 8 31	2364
7	Antares	W.	76 11 28	2278	77 58 0	2284	79 44 23	2289	81 30 38	2296
	Jupiter	W.	55 58 11	2256	57 45 15	2262	59 32 10	2268	61 18 56	2276
	α Arietis	E.	72 27 44	2398	70 44 7	2408	69 0 43	2418	67 17 34	2430
	Aldebaran	E.	103 10 35	2247	101 23 18	2253	99 36 9	2260	97 49 10	2267
8	Antares	W.	90 19 10	2337	92 4 16	2346	93 49 8	2357	95 33 45	2367
	Jupiter	W.	70 9 55	2318	71 55 28	2327	73 40 48	2337	75 25 53	2348
	α Aquilæ	W.	50 3 51	3567	51 23 1	3515	52 43 8	3471	54 4 5	3431
	α Arietis	E.	58 46 19	2501	57 5 7	2518	55 24 19	2537	53 43 57	2557
	Aldebaran	E.	88 57 4	2308	87 11 16	2317	85 25 42	2328	83 40 23	2337
9	Jupiter	W.	84 7 21	2405	85 50 48	2418	87 33 57	2431	89 16 47	2444
	α Aquilæ	W.	60 58 26	3297	62 22 41	3282	63 47 14	3269	65 12 2	3258
	α Arietis	E.	45 29 46	2683	43 52 43	2713	42 16 21	2748	40 40 45	2785
	Aldebaran	E.	74 57 41	2396	73 14 0	2408	71 30 36	2421	69 47 31	2433

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
10	Jupiter	W.	90° 59′ 19″	2458	92° 41′ 32″	2472	94° 23′ 25″	2485	96° 4′ 59″	2499
	α Aquilæ	W.	66 37 3	3250	68 2 13	3244	69 27 30	3240	70 52 52	3239
	Fomalhaut	W.	31 12 41	3243	32 37 59	3184	34 4 27	3136	35 31 53	3097
	α Arietis	E.	39 5 58	2825	37 32 3	2870	35 59 6	2920	34 27 12	2974
	Aldebaran	E.	68 4 44	2447	66 22 16	2461	64 40 8	2475	62 58 20	2489
11	Jupiter	W.	104 27 48	2573	106 7 20	2588	107 46 32	2603	109 25 23	2618
	α Aquilæ	W.	77 59 28	3254	79 24 33	3262	80 49 29	3271	82 14 14	3281
	Fomalhaut	W.	42 58 29	2986	44 28 59	2977	45 59 41	2969	47 30 32	2965
	Aldebaran	E.	54 34 19	2563	52 54 33	2578	51 15 8	2593	49 36 4	2610
12	α Aquilæ	W.	89 14 47	3345	90 38 7	3360	92 1 9	3377	93 23 52	3393
	Fomalhaut	W.	55 5 31	2967	56 36 25	2971	58 7 14	2977	59 37 56	2982
	α Pegasi	W.	41 51 1	3675	43 8 15	3630	44 26 17	3593	45 44 59	3561
	Aldebaran	E.	41 26 5	2688	39 49 9	2704	38 12 34	2720	36 36 21	2736
	Pollux	E.	85 39 33	2695	84 2 47	2711	82 26 22	2726	80 50 17	2741
	Venus	E.	105 51 37	3095	104 23 21	3112	102 55 26	3129	101 27 51	3144
13	Fomalhaut	W.	67 9 18	3022	68 39 4	3030	70 8 39	3040	71 38 2	3049
	α Pegasi	W.	52 25 54	3455	53 47 8	3444	55 8 35	3434	56 30 13	3425
	Pollux	E.	72 54 47	2815	71 20 39	2829	69 46 49	2844	68 13 18	2857
	Venus	E.	94 14 48	3225	92 49 8	3241	91 23 47	3256	89 58 44	3270
	Mars	E.	104 24 13	3018	102 54 23	3034	101 24 52	3047	99 55 38	3062
	Sun	E.	131 13 33	3168	129 46 46	3183	128 20 16	3197	126 54 3	3210
14	Fomalhaut	W.	79 2 0	3098	80 30 12	3109	81 58 11	3119	83 25 58	3129
	α Pegasi	W.	63 20 12	3405	64 42 23	3404	66 4 35	3404	67 26 47	3404
	Pollux	E.	60 30 5	2924	58 58 17	2938	57 26 46	2950	55 55 30	2962
	Venus	E.	82 57 44	3342	81 34 21	3355	80 11 13	3367	78 48 19	3380
	Mars	E.	92 33 44	3129	91 6 10	3141	89 38 50	3153	88 11 45	3165
	Sun	E.	119 46 57	3276	118 22 18	3288	116 57 53	3300	115 33 42	3313
15	Fomalhaut	W.	90 41 56	3176	92 8 34	3185	93 35 1	3194	95 1 17	3203
	Venus	E.	71 57 16	3437	70 35 41	3446	69 14 17	3455	67 53 3	3464
	Mars	E.	80 59 40	3218	79 33 52	3227	78 8 15	3236	76 42 48	3244
	Saturn	E.	83 27 53	3029	81 58 16	3038	80 28 50	3046	78 59 34	3054
	Regulus	E.	84 8 23	2989	82 37 57	2997	81 7 41	3006	79 37 36	3014
	Sun	E.	108 36 3	3365	107 13 6	3374	105 50 20	3384	104 27 45	3392
16	α Arietis	W.	41 36 31	3360	42 59 33	3348	44 22 49	3338	45 46 17	3327
	Venus	E.	61 9 14	3502	59 48 52	3508	58 28 37	3514	57 8 28	3519
	Mars	E.	69 37 50	3279	68 13 14	3285	66 48 45	3289	65 24 21	3294
	Saturn	E.	71 35 32	3087	70 7 7	3092	68 38 48	3097	67 10 35	3102
	Regulus	E.	72 9 25	3047	70 40 11	3052	69 11 3	3057	67 42 1	3062
	Sun	E.	97 37 1	3427	96 15 15	3433	94 53 36	3438	93 32 2	3442
17	α Arietis	W.	52 46 18	3287	54 10 45	3280	55 35 20	3273	57 0 3	3267
	Venus	E.	50 28 56	3536	49 9 12	3538	47 49 30	3540	46 29 50	3540
	Mars	E.	58 23 30	3309	56 59 29	3311	55 35 30	3312	54 11 32	3313
	Saturn	E.	59 50 38	3116	58 22 48	3118	56 55 0	3119	55 27 13	3119
	Regulus	E.	60 18 0	3077	58 49 22	3078	57 20 46	3079	55 52 11	3079
	Sun	E.	86 45 18	3457	85 24 6	3459	84 2 56	3460	82 41 47	3461

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
10	Jupiter	W.	97° 46′ 13″	2514	99° 27′ 7″	2528	101° 7′ 41″	2543	102° 47′ 55″	2558
	α Aquilæ	W.	72 18 15	3239	73 43 38	3241	75 8 59	3244	76 34 16	3248
	Fomalhaut	W.	37 0 6	3065	38 28 59	3039	39 58 24	3017	41 28 16	3000
	α Arietis	E.	32 56 27	3035	31 26 58	3104	29 58 53	3182	28 32 22	3272
	Aldebaran	E.	61 16 51	2503	59 35 42	2518	57 54 54	2533	56 14 26	2548
11	Jupiter	W.	111 3 53	2634	112 42 2	2649	114 19 51	2664	115 57 19	2680
	α Aquilæ	W.	83 38 48	3292	85 3 9	3303	86 27 17	3316	87 51 10	3330
	Fomalhaut	W.	49 1 29	2962	50 32 30	2961	52 3 32	2962	53 34 33	2964
	Aldebaran	E.	47 57 22	2625	46 19 1	2640	44 41 1	2656	43 3 22	2672
12	α Aquilæ	W.	94 46 16	3411	96 8 20	3431	97 30 2	3450	98 51 22	3471
	Fomalhaut	W.	61 8 31	2989	62 38 57	2997	64 9 14	3005	65 39 21	3013
	α Pegasi	W.	47 4 16	3533	48 24 4	3508	49 44 19	3488	51 4 57	3471
	Aldebaran	E.	35 0 29	2752	33 24 58	2768	31 49 48	2785	30 15 0	2801
	Pollux	E.	79 14 32	2756	77 39 7	2771	76 4 1	2785	74 29 14	2801
	Venus	E.	100 0 35	3161	98 33 39	3178	97 7 3	3193	95 40 46	3209
13	Fomalhaut	W.	73 7 14	3059	74 36 14	3069	76 5 1	3079	77 33 36	3088
	α Pegasi	W.	57 52 1	3418	59 13 57	3414	60 35 58	3410	61 58 3	3407
	Pollux	E.	66 40 4	2871	65 7 8	2885	63 34 30	2898	62 2 9	2912
	Venus	E.	88 33 58	3286	87 9 30	3300	85 45 18	3314	84 21 23	3328
	Mars	E.	98 26 42	3076	96 58 3	3089	95 29 40	3103	94 1 34	3116
	Sun	E.	125 28 6	3224	124 2 25	3237	122 37 0	3251	121 11 51	3264
14	Fomalhaut	W.	84 53 33	3138	86 20 56	3148	87 48 7	3158	89 15 7	3167
	α Pegasi	W.	68 48 59	3405	70 11 10	3407	71 33 19	3409	72 55 25	3412
	Pollux	E.	54 24 29	2973	52 53 43	2985	51 23 12	2997	49 52 55	3008
	Venus	E.	77 25 40	3392	76 3 14	3404	74 41 2	3415	73 19 3	3426
	Mars	E.	86 44 54	3177	85 18 17	3187	83 51 52	3198	82 25 40	3208
	Sun	E.	114 9 45	3324	112 46 1	3335	111 22 30	3345	109 59 11	3355
15	Fomalhaut	W.	96 27 23	3212	97 53 18	3220	99 19 4	3228	100 44 40	3236
	Venus	E.	66 31 59	3473	65 11 5	3481	63 50 20	3488	62 29 43	3496
	Mars	E.	75 17 31	3252	73 52 23	3259	72 27 24	3266	71 2 33	3273
	Saturn	E.	77 30 28	3062	76 1 32	3069	74 32 44	3075	73 4 4	3082
	Regulus	E.	78 7 40	3021	76 37 53	3028	75 8 15	3035	73 38 46	3042
	Sun	E.	103 5 19	3400	101 43 2	3408	100 20 54	3415	98 58 54	3421
16	α Arietis	W.	47 9 57	3318	48 33 48	3309	49 57 49	3301	51 21 59	3294
	Venus	E.	55 48 25	3524	54 28 27	3527	53 8 33	3531	51 48 43	3534
	Mars	E.	64 0 2	3298	62 35 48	3302	61 11 39	3305	59 47 33	3307
	Saturn	E.	65 42 28	3105	64 14 25	3109	62 46 26	3111	61 18 30	3114
	Regulus	E.	66 13 5	3065	64 44 13	3069	63 15 25	3072	61 46 41	3074
	Sun	E.	92 10 33	3446	90 49 9	3450	89 27 49	3453	88 6 32	3455
17	α Arietis	W.	58 24 53	3260	59 49 51	3254	61 14 56	3247	62 40 9	3242
	Venus	E.	45 10 10	3541	43 50 31	3541	42 30 52	3541	41 11 13	3539
	Mars	E.	52 47 35	3313	51 23 38	3312	49 59 40	3311	48 35 41	3310
	Saturn	E.	53 59 26	3119	52 31 39	3119	51 3 52	3118	49 36 4	3116
	Regulus	E.	54 23 36	3080	52 55 2	3080	51 26 28	3079	49 57 53	3078
	Sun	E.	81 20 39	3460	79 59 30	3460	78 38 21	3459	77 17 11	3457

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
18	α Arietis	W.	64° 5′ 29″	3235	65° 30′ 57″	3228	66° 56′ 33″	3221	68° 22′ 17″	3214
	Aldebaran	W.	31 59 30	3082	33 28 2	3078	34 56 39	3073	36 25 21	3069
	Venus	E.	39 51 32	3538	38 31 50	3536	37 12 6	3534	35 52 19	3532
	Mars	E.	47 11 41	3308	45 47 39	3306	44 23 34	3303	42 59 26	3300
	Saturn	E.	48 8 14	3114	46 40 22	3112	45 12 27	3110	43 44 29	3107
	Regulus	E.	48 29 16	3076	47 0 37	3074	45 31 56	3073	44 3 13	3070
	Sun	E.	75 55 59	3454	74 34 44	3453	73 13 27	3450	71 52 7	3446
19	α Arietis	W.	75 33 2	3178	76 59 38	3170	78 26 23	3162	79 53 18	3153
	Aldebaran	W.	43 50 25	3040	45 19 48	3034	46 49 19	3027	48 18 58	3020
	Venus	E.	29 12 36	3514	27 52 27	3510	26 32 14	3506	25 11 56	3501
	Mars	E.	35 57 40	3278	34 33 3	3272	33 8 19	3267	31 43 29	3261
	Saturn	E.	36 23 35	3086	34 55 8	3081	33 26 35	3075	31 57 55	3069
	Regulus	E.	36 38 40	3052	35 9 31	3047	33 40 17	3043	32 10 57	3038
	Sun	E.	65 4 16	3423	63 42 25	3416	62 20 27	3409	60 58 21	3402
20	α Arietis	W.	87 10 25	3110	88 38 23	3101	90 6 32	3091	91 34 52	3082
	Aldebaran	W.	55 49 38	2979	57 20 17	2969	58 51 8	2959	60 22 12	2949
	Sun	E.	54 5 46	3364	52 42 48	3354	51 19 39	3345	49 56 20	3337
21	Aldebaran	W.	68 0 44	2897	69 33 7	2886	71 5 44	2874	72 38 36	2862
	Pollux	W.	24 17 57	3006	25 48 2	2982	27 18 37	2961	28 49 39	2941
	Sun	E.	42 57 1	3288	41 32 35	3277	40 7 57	3268	38 43 8	3259
22	Aldebaran	W.	80 26 44	2802	82 1 9	2791	83 35 49	2779	85 10 45	2766
	Pollux	W.	36 30 47	2852	38 4 7	2836	39 37 48	2821	41 11 49	2805
	Sun	E.	31 36 16	3213	30 10 22	3205	28 44 19	3199	27 18 9	3193
26	Sun	W.	18 6 59	2924	19 38 48	2891	21 11 18	2864	22 44 23	2840
	Antares	E.	48 3 23	2497	46 22 6	2492	44 40 42	2488	42 59 12	2485
	Jupiter	E.	69 4 31	2467	67 22 31	2459	65 40 20	2451	63 57 58	2443
	α Aquilæ	E.	95 33 51	3115	94 6 0	3105	92 37 56	3095	91 9 40	3087
27	Sun	W.	30 36 16	2760	32 11 37	2747	33 47 14	2737	35 23 5	2726
	Antares	E.	34 31 5	2485	32 49 31	2489	31 8 3	2497	29 26 45	2506
	Jupiter	E.	55 23 31	2409	53 40 9	2403	51 56 39	2397	50 13 0	2391
	α Aquilæ	E.	83 46 19	3065	82 17 26	3064	80 48 32	3065	79 19 39	3067
28	Sun	W.	43 25 22	2687	45 2 19	2681	46 39 25	2675	48 16 39	2670
	Jupiter	E.	41 32 54	2368	39 48 33	2364	38 4 6	2360	36 19 34	2357
	α Aquilæ	E.	71 56 42	3105	70 28 38	3118	69 0 50	3133	67 33 20	3150
	Fomalhaut	E.	103 55 47	2540	102 15 30	2534	100 35 4	2527	98 54 29	2522
29	Sun	W.	56 24 24	2648	58 2 14	2645	59 40 8	2642	61 18 6	2639
	α Aquilæ	E.	60 22 0	3275	58 57 19	3310	57 33 19	3348	56 10 3	3391
	Fomalhaut	E.	90 29 55	2503	88 48 46	2500	87 7 33	2499	85 26 18	2498
	α Pegasi	E.	106 55 47	2747	105 20 10	2738	103 44 20	2729	102 8 19	2722
30	Sun	W.	69 28 47	2629	71 7 3	2627	72 45 21	2626	74 23 40	2625
	α Aquilæ	E.	49 27 36	3685	48 10 33	3764	46 54 53	3852	45 40 44	3950
	Fomalhaut	E.	76 59 59	2501	75 18 47	2504	73 37 39	2507	71 56 35	2510
	α Pegasi	E.	94 6 10	2698	92 29 28	2696	90 52 43	2695	89 15 56	2695

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P.L. of Diff.	XVh.	P.L. of Diff.	XVIIIh.	P.L. of Diff.	XXIh.	P.L. of Diff.
18	α Arietis	W.	69° 48′ 9″	3207	71° 14′ 10″	3200	72° 40′ 19″	3193	74° 6′ 36″	3186
	Aldebaran	W.	37 54 9	3064	39 23 3	3059	40 52 3	3053	42 21 10	3047
	Venus	E.	34 32 30	3529	33 12 38	3525	31 52 42	3521	30 32 41	3517
	Mars	E.	41 35 14	3296	40 10 58	3292	38 46 37	3288	37 22 11	3283
	Saturn	E.	42 16 28	3104	40 48 23	3100	39 20 13	3095	37 51 57	3090
	Regulus	E.	42 34 27	3067	41 5 37	3064	39 36 43	3060	38 7 44	3056
	Sun	E.	70 30 43	3442	69 9 14	3438	67 47 40	3433	66 26 1	3428
19	α Arietis	W.	81 20 23	3145	82 47 38	3137	84 15 3	3128	85 42 39	3119
	Aldebaran	W.	49 48 46	3012	51 18 44	3004	52 48 52	2996	54 19 10	2988
	Venus	E.	23 51 33	3497	22 31 6	3495	21 10 36	3492	19 50 3	3489
	Mars	E.	30 18 32	3255	28 53 28	3248	27 28 16	3242	26 2 57	3236
	Saturn	E.	30 29 8	3064	29 0 14	3058	27 31 13	3052	26 2 4	3046
	Regulus	E.	30 41 31	3033	29 11 59	3029	27 42 22	3024	26 12 39	3020
	Sun	E.	59 36 7	3394	58 13 44	3387	56 51 13	3380	55 28 34	3372
20	α Arietis	W.	93 3 24	3073	94 32 7	3063	96 1 2	3053	97 30 9	3043
	Aldebaran	W.	61 53 29	2939	63 24 58	2929	64 56 40	2919	66 28 35	2908
	Sun	E.	48 32 51	3327	47 9 11	3317	45 45 19	3307	44 21 16	3297
21	Aldebaran	W.	74 11 43	2851	75 45 5	2839	77 18 42	2827	78 52 35	2815
	Pollux	W.	30 21 6	2922	31 52 57	2904	33 25 11	2886	34 57 48	2869
	Sun	E.	37 18 8	3249	35 52 57	3239	34 27 34	3230	33 2 0	3221
22	Aldebaran	W.	86 45 58	2753	88 21 27	2741	89 57 13	2729	91 33 15	2716
	Pollux	W.	42 46 10	2790	44 20 51	2775	45 55 51	2761	47 31 10	2747
	Sun	E.	25 51 52	3189	24 25 30	3187	22 59 5	3187	21 32 40	3190
26	Sun	W.	24 17 59	2820	25 52 1	2802	27 26 26	2786	29 1 12	2772
	Antares	E.	41 17 38	2483	39 36 1	2482	37 54 22	2483	36 12 43	2488
	Jupiter	E.	62 15 25	2436	60 32 42	2429	58 49 48	2422	57 6 44	2415
	α Aquilæ	E.	89 41 14	3079	88 12 39	3073	86 43 57	3069	85 15 10	3066
27	Sun	W.	36 59 10	2717	38 35 27	2709	40 11 55	2701	41 48 34	2694
	Antares	E.	27 45 40	2518	26 4 52	2535	24 24 27	2556	22 44 32	2585
	Jupiter	E.	48 29 13	2386	46 45 18	2381	45 1 16	2377	43 17 8	2373
	α Aquilæ	E.	77 50 49	3071	76 22 4	3078	74 53 27	3085	73 24 59	3094
28	Sun	W.	49 53 59	2665	51 31 26	2660	53 9 0	2656	54 46 39	2652
	Jupiter	E.	34 34 57	2353	32 50 15	2350	31 5 29	2348	29 20 39	2345
	α Aquilæ	E.	66 6 11	3170	64 39 26	3192	63 13 7	3216	61 47 17	3244
	Fomalhaut	E.	97 13 46	2517	95 32 57	2513	93 52 2	2509	92 11 1	2505
29	Sun	W.	62 56 8	2636	64 34 14	2634	66 12 23	2632	67 50 34	2631
	α Aquilæ	E.	54 47 36	3438	53 26 2	3490	52 5 27	3548	50 45 56	3613
	Fomalhaut	E.	83 45 2	2498	82 3 46	2498	80 22 30	2498	78 41 14	2499
	α Pegasi	E.	100 32 8	2715	98 55 48	2710	97 19 21	2705	95 42 48	2701
30	Sun	W.	76 2 1	2624	77 40 23	2624	79 18 46	2624	80 57 9	2623
	α Aquilæ	E.	44 28 15	4061	43 17 35	4184	42 8 54	4322	41 2 22	4476
	Fomalhaut	E.	70 15 36	2515	68 34 43	2520	66 53 57	2525	65 13 19	2532
	α Pegasi	E.	87 39 9	2695	86 2 23	2696	84 25 38	2698	82 48 56	2702

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Tues.	1	12 31 9.50	9.062	S. 3 21 54.9	–58.23	16 1.56	64.37	10 26.81	0.792
Wed.	2	12 34 47.14	9.074	3 45 11.3	58.13	16 1.84	64.42	10 45.68	0.780
Thur.	3	12 38 25.08	9.087	4 8 25.1	58.01	16 2.13	64.47	11 4.24	0.767
Frid.	4	12 42 3.34	9.101	4 31 35.7	–57.88	16 2.42	64.52	11 22.48	0.753
Sat.	5	12 45 41.94	9.116	4 54 43.0	57.73	16 2.70	64.58	11 40.38	0.738
SUN.	6	12 49 20.91	9.132	5 17 46.5	57.56	16 2.98	64.64	11 57.92	0.722
Mon.	7	12 53 0.28	9.149	5 40 45.9	–57.38	16 3.26	64.70	12 15.06	0.705
Tues.	8	12 56 40.05	9.167	6 3 40.8	57.19	16 3.54	64.76	12 31.79	0.687
Wed.	9	13 0 20.26	9.185	6 26 30.9	56.98	16 3.82	64.83	12 48.09	0.669
Thur.	10	13 4 0.92	9.205	6 49 15.9	–56.76	16 4.10	64.90	13 3.94	0.649
Frid.	11	13 7 42.07	9.225	7 11 55.4	56.52	16 4.37	64.97	13 19.30	0.629
Sat.	12	13 11 23.72	9.247	7 34 29.1	56.27	16 4.64	65.04	13 34.15	0.607
SUN.	13	13 15 5.90	9.269	7 56 56.5	–56.00	16 4.91	65.12	13 48.49	0.585
Mon.	14	13 18 48.63	9.292	8 19 17.3	55.72	16 5.18	65.20	14 2.28	0.562
Tues.	15	13 22 31.92	9.316	8 41 31.3	55.43	16 5.45	65.28	14 15.51	0.538
Wed.	16	13 26 15.79	9.341	9 3 38.0	–55.12	16 5.72	65.36	14 28.15	0.513
Thur.	17	13 30 0.28	9.366	9 25 37.1	54.79	16 5.98	65.45	14 40.18	0.488
Frid.	18	13 33 45.39	9.392	9 47 28.1	54.45	16 6.25	65.54	14 51.59	0.462
Sat.	19	13 37 31.14	9.419	10 9 10.7	–54.09	16 6.51	65.63	15 2.37	0.435
SUN.	20	13 41 17.53	9.446	10 30 44.5	53.71	16 6.78	65.72	15 12.50	0.408
Mon.	21	13 45 4.59	9.474	10 52 9.1	53.32	16 7.04	65.82	15 21.97	0.380
Tues.	22	13 48 52.33	9.502	11 13 24.0	–52.91	16 7.31	65.92	15 30.77	0.352
Wed.	23	13 52 40.77	9.532	11 34 28.9	52.48	16 7.57	66.02	15 38.86	0.324
Thur.	24	13 56 29.92	9.560	11 55 23.3	52.03	16 7.84	66.12	15 46.25	0.295
Frid.	25	14 0 19.76	9.591	12 16 6.7	–51.57	16 8.10	66.23	15 52.94	0.264
Sat.	26	14 4 10.32	9.622	12 36 38.8	51.09	16 8.37	66.33	15 58.92	0.233
SUN.	27	14 8 1.63	9.653	12 56 59.3	50.59	16 8.63	66.44	16 4.15	0.202
Mon.	28	14 11 53.68	9.684	13 17 7.6	–50.07	16 8.89	66.55	16 8.63	0.171
Tues.	29	14 15 46.48	9.716	13 37 3.3	49.54	16 9.15	66.66	16 12.37	0.139
Wed.	30	14 19 40.04	9.747	13 56 45.9	48.99	16 9.41	66.77	16 15.36	0.108
Thur.	31	14 23 34.36	9.779	14 16 15.0	48.42	16 9.67	66.88	16 17.59	0.076
Frid.	32	14 27 29.46	9.812	S. 14 35 30.2	–47.83	16 9.93	66.99	16 19.05	0.043

NOTE.—The mean time of semidiameter passing may be found by subtracting $0^s.18$ from the sidereal time.

The sign – prefixed to the hourly change of declination indicates that south declinations are increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	THE SUN'S Diff. for 1 Hour.	THE SUN'S Apparent Declination.	THE SUN'S Diff. for 1 Hour.	Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ′ ″	″	m s	s	h m s
Tues.	1	12 31 11.09	9.064	S. 3 22 5.1	−58.24	10 26.94	0.792	12 41 38.03
Wed.	2	12 34 48.77	9.076	3 45 21.8	58.14	10 45.81	0.780	12 45 34.58
Thur.	3	12 38 26.76	9.089	4 8 35.8	58.02	11 4.37	0.767	12 49 31.13
Frid.	4	12 42 5.07	9.103	4 31 46.7	−57.89	11 22.62	0.753	12 53 27.69
Sat.	5	12 45 43.72	9.118	4 54 54.2	57.75	11 40.52	0.738	12 57 24.24
SUN.	6	12 49 22.74	9.134	5 17 58.0	57.57	11 58.06	0.722	13 1 20.80
Mon.	7	12 53 2.15	9.151	5 40 57.6	−57.39	12 15.20	0.705	13 5 17.35
Tues.	8	12 56 41.97	9.169	6 3 52.7	57.20	12 31.93	0.687	13 9 13.90
Wed.	9	13 0 22.22	9.187	6 26 43.0	56.99	12 48.23	0.669	13 13 10.45
Thur.	10	13 4 2.93	9.207	6 49 28.2	−56.77	13 4.08	0.649	13 17 7.01
Frid.	11	13 7 44.12	9.227	7 12 7.9	56.53	13 19.44	0.629	13 21 3.56
Sat.	12	13 11 25.81	9.249	7 34 41.8	56.28	13 34.29	0.607	13 25 0.11
SUN.	13	13 15 8.03	9.271	7 57 9.4	−56.01	13 48.63	0.585	13 28 56.66
Mon.	14	13 18 50.80	9.294	8 19 30.4	55.73	14 2.42	0.562	13 32 53.22
Tues.	15	13 22 34.13	9.318	8 41 44.5	55.44	14 15.64	0.538	13 36 49.77
Wed.	16	13 26 18.04	9.343	9 3 51.3	−55.13	14 28.28	0.513	13 40 46.32
Thur.	17	13 30 2.57	9.368	9 25 50.5	54.80	14 40.31	0.488	13 44 42.88
Frid.	18	13 33 47.72	9.394	9 47 41.6	54.45	14 51.71	0.462	13 48 39.43
Sat.	19	13 37 33.50	9.421	10 9 24.3	−54.09	15 2.48	0.435	13 52 35.98
SUN.	20	13 41 19.93	9.448	10 30 58.2	53.71	15 12.61	0.408	13 56 32.54
Mon.	21	13 45 7.02	9.476	10 52 22.8	53.32	15 22.07	0.380	14 0 29.09
Tues.	22	13 48 54.79	9.504	11 13 37.7	−52.91	15 30.86	0.352	14 4 25.65
Wed.	23	13 52 43.26	9.533	11 34 42.6	52.48	15 38.94	0.324	14 8 22.20
Thur.	24	13 56 32.43	9.561	11 55 37.0	52.03	15 46.33	0.295	14 12 18.76
Frid.	25	14 0 22.30	9.592	12 16 20.4	−51.57	15 53.01	0.264	14 16 15.31
Sat.	26	14 4 12.89	9.623	12 36 52.5	51.09	15 58.98	0.233	14 20 11.87
SUN.	27	14 8 4.22	9.654	12 57 12.9	50.59	16 4.20	0.202	14 24 8.42
Mon.	28	14 11 56.29	9.685	13 17 21.1	−50.07	16 8.68	0.171	14 28 4.97
Tues.	29	14 15 49.11	9.717	13 37 16.7	49.54	16 12.41	0.139	14 32 1.52
Wed.	30	14 19 42.68	9.748	13 56 59.2	48.99	16 15.39	0.108	14 35 58.07
Thur.	31	14 23 37.02	9.780	14 16 28.2	48.42	16 17.61	0.076	14 39 54.63
Frid.	32	14 27 32.13	9.813	S. 14 35 43.3	−47.83	16 19.06	0.043	14 43 51.19

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 Hour,
+9s.8565.
(Table III.)

AT GREENWICH MEAN NOON.								Mean Time of Sidereal Noon.
Day of the Month.	Day of the Year.	THE SUN'S						
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	
		λ	λ′					
		° ′ ″	′ ″	″	″			h m s
1	274	188 29 39.0	29 18.9	147.70	− 0.11	0.0001987	−53.3	11 16 30.84
2	275	189 28 44.6	28 24.4	147.78	0.24	0.0000706	53.3	11 12 34.94
3	276	190 27 52.0	27 31.7	147.85	0.37	9.9999425	53.3	11 8 39.03
4	277	191 27 1.2	26 40.8	147.92	− 0.48	9.9998145	−53.2	11 4 43.12
5	278	192 26 12.2	25 51.7	148.00	0.58	9.9996868	53.1	11 0 47.22
6	279	193 25 25.0	25 4.4	148.07	0.66	9.9995595	52.9	10 56 51.31
7	280	194 24 39.6	24 18.9	148.15	− 0.70	9.9994328	−52.7	10 52 55.40
8	281	195 23 56.2	23 35.4	148.23	0.72	9.9993067	52.4	10 48 59.49
9	282	196 23 14.7	22 53.8	148.31	0.70	9.9991813	52.1	10 45 3.58
10	283	197 22 35.3	22 14.3	148.40	− 0.66	9.9990567	−51.8	10 41 7.68
11	284	198 21 58.0	21 36.9	148.49	0.59	9.9989329	51.4	10 37 11.77
12	285	199 21 22.8	21 1.6	148.58	0.49	9.9988099	51.1	10 33 15.86
13	286	200 20 49.9	20 28.6	148.68	− 0.37	9.9986876	−50.8	10 29 19.95
14	287	201 20 19.2	19 57.8	148.77	0.24	9.9985660	50.5	10 25 24.05
15	288	202 19 50.8	19 29.3	148.87	− 0.11	9.9984451	50.3	10 21 28.14
16	289	203 19 24.7	19 3.1	148.96	+ 0.02	9.9983248	−50.0	10 17 32.23
17	290	204 19 0.9	18 39.2	149.06	0.15	9.9982050	49.8	10 13 36.32
18	291	205 18 39.5	18 17.7	149.15	0.26	9.9980856	49.6	10 9 40.42
19	292	206 18 20.3	17 58.4	149.25	+ 0.34	9.9979664	−49.5	10 5 44.51
20	293	207 18 3.4	17 41.4	149.34	0.41	9.9978475	49.4	10 1 48.60
21	294	208 17 48.8	17 26.7	149.43	0.45	9.9977288	49.4	9 57 52.69
22	295	209 17 36.3	17 14.1	149.52	+ 0.45	9.9976102	−49.4	9 53 56.78
23	296	210 17 25.9	17 3.6	149.61	0.44	9.9974917	49.4	9 50 0.87
24	297	211 17 17.5	16 55.1	149.69	0.39	9.9973732	49.4	9 46 4.96
25	298	212 17 11.1	16 48.6	149.77	+ 0.31	9.9972549	−49.3	9 42 9.05
26	299	213 17 6.5	16 43.9	149.85	0.21	9.9971368	49.2	9 38 13.15
27	300	214 17 3.7	16 41.0	149.92	+ 0.10	9.9970189	49.1	9 34 17.24
28	301	215 17 2.7	16 39.8	149.99	− 0.03	9.9969013	−48.9	9 30 21.33
29	302	216 17 3.3	16 40.3	150.06	0.16	9.9967843	48.6	9 26 25.42
30	303	217 17 5.5	16 42.4	150.13	0.29	9.9966679	48.3	9 22 29.52
31	304	218 17 9.4	16 46.2	150.19	0.41	9.9965523	48.0	9 18 33.61
32	305	219 17 14.9	16 51.5	150.26	− 0.52	9.9964376	−47.5	9 14 37.70

Note.—The numbers in column λ correspond to the true equinox of the date; in column λ′, to the mean equinox of January $0^d.0$.

Diff. for 1 Hour,
— $9^s.8296$.
(Table II.)

GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	16 10.6	16 10.5	59 15.3	+0.04	59 15.1	−0.07	5 36.5	2.50	6.4
2	16 10.1	16 9.4	59 13.8	−0.16	59 11.3	0.26	6 36.5	2.49	7.4
3	16 8.4	16 7.1	59 7.6	0.36	59 2.7	0.46	7 35.6	2.42	8.4
4	16 5.4	16 3.4	58 56.6	−0.56	58 49.3	−0.68	8 32.4	2.30	9.4
5	16 1.1	15 58.3	58 40.6	0.79	58 30.6	0.90	9 26.2	2.17	10.4
6	15 55.2	15 51.8	58 19.2	1.00	58 6.5	1.12	10 17.0	2.06	11.4
7	15 48.0	15 43.9	57 52.5	−1.22	57 37.4	−1.30	11 5.3	1.97	12.4
8	15 39.5	15 34.9	57 21.4	1.38	57 4.5	1.44	11 52.0	1.92	13.4
9	15 30.1	15 25.3	56 47.0	1.47	56 29.3	1.49	12 37.9	1.90	14.4
10	15 20.5	15 15.7	56 11.5	−1.48	55 54.0	−1.44	13 23.6	1.91	15.4
11	15 11.1	15 6.8	55 37.1	1.38	55 21.0	1.30	14 9.8	1.94	16.4
12	15 2.6	14 59.0	55 6.0	1.19	54 52.5	1.06	14 56.9	1.98	17.4
13	14 55.8	14 53.1	54 40.7	−0.91	54 30.8	−0.75	15 45.0	2.02	18.4
14	14 50.9	14 49.4	54 23.0	0.56	54 17.4	−0.36	16 33.8	2.05	19.4
15	14 48.5	14 48.4	54 14.2	−0.16	54 13.6	+0.06	17 23.1	2.05	20.4
16	14 48.9	14 50.1	54 15.6	+0.27	54 20.1	+0.49	18 12.2	2.04	21.4
17	14 52.1	14 54.8	54 27.3	0.71	54 37.2	0.92	19 0.8	2.01	22.4
18	14 58.1	15 2.1	54 49.4	1.11	55 3.9	1.30	19 48.5	1.97	23.4
19	15 6.6	15 11.7	55 20.7	+1.48	55 39.4	+1.63	20 35.5	1.94	24.4
20	15 17.3	15 23.2	55 59.7	1.75	56 21.4	1.85	21 22.0	1.93	25.4
21	15 29.3	15 35.6	56 44.0	1.90	57 7.1	1.94	22 8.6	1.95	26.4
22	15 42.0	15 48.2	57 30.4	+1.92	57 53.2	+1.86	22 56.0	2.00	27.4
23	15 54.1	15 59.7	58 15.1	1.77	58 35.7	1.64	23 45.1	2.10	28.4
24	16 4.9	16 9.3	58 54.5	1.48	59 11.1	1.28	☌		29.4
25	16 13.2	16 16.3	59 25.2	+1.06	59 36.5	+0.82	0 36.7	2.22	0.9
26	16 18.6	16 20.1	59 44.9	0.58	59 50.4	+0.34	1 31.5	2.35	1.9
27	16 20.8	16 20.7	59 52.9	+0.10	59 52.7	−0.13	2 29.4	2.48	2.9
28	16 19.9	16 18.5	59 49.8	−0.34	59 44.7	−0.51	3 29.8	2.55	3.9
29	16 16.6	16 14.1	59 37.5	0.68	59 28.5	0.80	4 31.0	2.54	4.9
30	16 11.3	16 8.1	59 18.1	0.91	59 6.6	1.00	5 31.2	2.46	5.9
31	16 4.8	16 1.2	58 54.2	1.06	58 41.1	1.11	6 28.6	2.32	6.9
32	15 57.5	15 53.7	58 27.6	−1.15	58 13.6	−1.18	7 22.6	2.18	7.9

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

TUESDAY 1.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	18 4 41.50	2.5536	S.22 53 22.1	2.805
1	18 7 14.77	2.5553	22 56 5.8	2.651
2	18 9 48.14	2.5570	22 58 40.3	2.497
3	18 12 21.61	2.5585	23 1 5.5	2.343
4	18 14 55.16	2.5598	23 3 21.5	2.189
5	18 17 28.79	2.5611	23 5 28.2	2.035
6	18 20 2.50	2.5624	23 7 25.7	1.880
7	18 22 36.28	2.5635	23 9 13.8	1.724
8	18 25 10.12	2.5644	23 10 52.6	1.569
9	18 27 44.01	2.5653	23 12 22.1	1.413
10	18 30 17.96	2.5662	23 13 42.2	1.257
11	18 32 51.95	2.5668	23 14 52.9	1.101
12	18 35 25.98	2.5674	23 15 54.3	0.945
13	18 38 0.04	2.5678	23 16 46.3	0.787
14	18 40 34.12	2.5682	23 17 28.8	0.630
15	18 43 8.22	2.5684	23 18 1.9	0.473
16	18 45 42.33	2.5685	23 18 25.6	0.317
17	18 48 16.44	2.5685	23 18 39.9	0.160
18	18 50 50.55	2.5684	23 18 44.8	− 0.003
19	18 53 24.65	2.5682	23 18 40.3	+ 0.154
20	18 55 58.74	2.5680	23 18 26.4	0.311
21	18 58 32.81	2.5676	23 18 3.0	0.468
22	19 1 6.85	2.5670	23 17 30.2	0.624
23	19 3 40.85	2.5663	S.23 16 48.1	0.780

WEDNESDAY 2.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	19 6 14.81	2.5656	S.23 15 56.6	0.937
1	19 8 48.72	2.5647	23 14 55.7	1.093
2	19 11 22.58	2.5638	23 13 45.4	1.249
3	19 13 56.38	2.5628	23 12 25.8	1.405
4	19 16 30.12	2.5617	23 10 56.8	1.561
5	19 19 3.78	2.5603	23 9 18.5	1.716
6	19 21 37.36	2.5589	23 7 30.9	1.871
7	19 24 10.85	2.5574	23 5 34.0	2.025
8	19 26 44.25	2.5559	23 3 27.9	2.179
9	19 29 17.56	2.5543	23 1 12.5	2.333
10	19 31 50.77	2.5525	22 58 47.9	2.486
11	19 34 23.86	2.5505	22 56 14.2	2.638
12	19 36 56.83	2.5485	22 53 31.3	2.791
13	19 39 29.68	2.5465	22 50 39.2	2.944
14	19 42 2.41	2.5443	22 47 38.0	3.095
15	19 44 35.00	2.5420	22 44 27.8	3.245
16	19 47 7.45	2.5397	22 41 8.6	3.395
17	19 49 39.76	2.5371	22 37 40.4	3.545
18	19 52 11.91	2.5345	22 34 3.2	3.694
19	19 54 43.90	2.5319	22 30 17.1	3.842
20	19 57 15.74	2.5292	22 26 22.1	3.990
21	19 59 47.41	2.5264	22 22 18.3	4.137
22	20 2 18.91	2.5235	22 18 5.7	4.283
23	20 4 50.23	2.5205	22 13 44.3	4.429
24	20 7 21.37	2.5174	S.22 9 14.2	4.573

THURSDAY 3.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	20 7 21.37	2.5174	S.22 9 14.2	4.573
1	20 9 52.32	2.5142	22 4 35.5	4.717
2	20 12 23.08	2.5110	21 59 48.1	4.861
3	20 14 53.64	2.5077	21 54 52.2	5.003
4	20 17 24.00	2.5043	21 49 47.8	5.144
5	20 19 54.16	2.5009	21 44 34.9	5.285
6	20 22 24.11	2.4973	21 39 13.6	5.424
7	20 24 53.84	2.4937	21 33 44.0	5.563
8	20 27 23.35	2.4900	21 28 6.1	5.701
9	20 29 52.64	2.4863	21 22 19.9	5.838
10	20 32 21.71	2.4826	21 16 25.5	5.974
11	20 34 50.55	2.4787	21 10 23.0	6.108
12	20 37 19.15	2.4747	21 4 12.5	6.242
13	20 39 47.51	2.4707	20 57 54.0	6.375
14	20 42 15.63	2.4667	20 51 27.5	6.507
15	20 44 43.51	2.4626	20 44 53.1	6.638
16	20 47 11.14	2.4584	20 38 10.9	6.768
17	20 49 38.52	2.4542	20 31 21.0	6.897
18	20 52 5.65	2.4500	20 24 23.3	7.025
19	20 54 32.52	2.4457	20 17 18.0	7.151
20	20 56 59.13	2.4413	20 10 5.2	7.276
21	20 59 25.48	2.4369	20 2 44.9	7.400
22	21 1 51.56	2.4324	19 55 17.2	7.523
23	21 4 17.37	2.4280	S.19 47 42.2	7.645

FRIDAY 4.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	21 6 42.92	2.4236	S.19 39 59.8	7.767
1	21 9 8.20	2.4190	19 32 10.2	7.886
2	21 11 33.20	2.4144	19 24 13.5	8.003
3	21 13 57.93	2.4098	19 16 9.8	8.120
4	21 16 22.38	2.4052	19 7 59.1	8.237
5	21 18 46.55	2.4005	18 59 41.4	8.352
6	21 21 10.44	2.3958	18 51 16.9	8.465
7	21 23 34.05	2.3912	18 42 45.6	8.577
8	21 25 57.38	2.3865	18 34 7.6	8.688
9	21 28 20.43	2.3817	18 25 23.0	8.797
10	21 30 43.19	2.3769	18 16 31.9	8.906
11	21 33 5.66	2.3721	18 7 34.3	9.013
12	21 35 27.84	2.3673	17 58 30.3	9.119
13	21 37 49.73	2.3625	17 49 20.0	9.223
14	21 40 11.34	2.3577	17 40 3.5	9.327
15	21 42 32.66	2.3529	17 30 40.8	9.428
16	21 44 53.69	2.3480	17 21 12.1	9.528
17	21 47 14.42	2.3432	17 11 37.4	9.628
18	21 49 34.87	2.3384	17 1 56.7	9.727
19	21 51 55.03	2.3335	16 52 10.2	9.823
20	21 54 14.89	2.3286	16 42 17.9	9.918
21	21 56 34.46	2.3237	16 32 20.0	10.012
22	21 58 53.74	2.3189	16 22 16.5	10.104
23	22 1 12.73	2.3141	16 12 7.5	10.196
24	22 3 31.44	2.3093	S.16 1 53.0	10.286

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	SATURDAY 5.					MONDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	22 3 31.44	2.3093	S. 16 1 53.0	10.286	0	23 49 13.97	2.1086	S. 6 30 36.6	12.999
1	22 5 49.85	2.3044	15 51 33.2	10.374	1	23 51 20.39	2.1054	6 17 35.9	13.023
2	22 8 7.97	2.2997	15 41 8.1	10.461	2	23 53 26.62	2.1023	6 4 33.8	13.047
3	22 10 25.81	2.2949	15 30 37.9	10.546	3	23 55 32.67	2.0992	5 51 30.3	13.068
4	22 12 43.36	2.2901	15 20 2.6	10.631	4	23 57 38.53	2.0962	5 38 25.6	13.088
5	22 15 0.62	2.2853	15 9 22.2	10.715	5	23 59 44.22	2.0933	5 25 19.7	13.107
6	22 17 17.59	2.2805	14 58 36.8	10.797	6	0 1 49.73	2.0903	5 12 12.7	13.125
7	22 19 34.28	2.2758	14 47 46.6	10.877	7	0 3 55.06	2.0875	4 59 4.7	13.142
8	22 21 50.69	2.2711	14 36 51.6	10.955	8	0 6 0.23	2.0847	4 45 55.7	13.158
9	22 24 6.81	2.2664	14 25 52.0	11.032	9	0 8 5.23	2.0820	4 32 45.8	13.172
10	22 26 22.65	2.2617	14 14 47.8	11.108	10	0 10 10.07	2.0792	4 19 35.1	13.185
11	22 28 38.21	2.2570	14 3 39.0	11.184	11	0 12 14.74	2.0765	4 6 23.6	13.197
12	22 30 53.49	2.2523	13 52 25.7	11.257	12	0 14 19.25	2.0738	3 53 11.5	13.207
13	22 33 8.49	2.2477	13 41 8.1	11.329	13	0 16 23.60	2.0713	3 39 58.8	13.216
14	22 35 23.22	2.2432	13 29 46.2	11.400	14	0 18 27.81	2.0689	3 26 45.6	13.224
15	22 37 37.67	2.2386	13 18 20.1	11.469	15	0 20 31.87	2.0665	3 13 31.9	13.232
16	22 39 51.85	2.2341	13 6 49.9	11.537	16	0 22 35.79	2.0641	3 0 17.8	13.238
17	22 42 5.76	2.2296	12 55 15.7	11.603	17	0 24 39.56	2.0617	2 47 3.4	13.242
18	22 44 19.40	2.2251	12 43 37.5	11.669	18	0 26 43.19	2.0594	2 33 48.8	13.245
19	22 46 32.77	2.2206	12 31 55.4	11.733	19	0 28 46.69	2.0571	2 20 34.0	13.247
20	22 48 45.87	2.2162	12 20 9.5	11.796	20	0 30 50.05	2.0549	2 7 19.1	13.248
21	22 50 58.71	2.2118	12 8 19.9	11.857	21	0 32 53.28	2.0528	1 54 4.2	13.248
22	22 53 11.28	2.2074	11 56 26.7	11.916	22	0 34 56.39	2.0507	1 40 49.3	13.247
23	22 55 23.60	2.2031	S. 11 44 30.0	11.973	23	0 36 59.37	2.0487	S. 1 27 34.5	13.246
	SUNDAY 6.					TUESDAY 8.			
0	22 57 35.66	2.1988	S. 11 32 29.9	12.030	0	0 39 2.23	2.0467	S. 1 14 19.8	13.243
1	22 59 47.46	2.1946	11 20 26.4	12.087	1	0 41 4.98	2.0448	1 1 5.4	13.238
2	23 1 59.01	2.1904	11 8 19.5	12.142	2	0 43 7.61	2.0429	0 47 51.3	13.232
3	23 4 10.31	2.1862	10 56 9.4	12.194	3	0 45 10.13	2.0411	0 34 37.6	13.224
4	23 6 21.36	2.1821	10 43 56.2	12.246	4	0 47 12.54	2.0394	0 21 24.4	13.216
5	23 8 32.16	2.1780	10 31 39.9	12.296	5	0 49 14.85	2.0377	S. 0 8 11.6	13.208
6	23 10 42.72	2.1739	10 19 20.7	12.344	6	0 51 17.06	2.0360	N. 0 5 0.6	13.198
7	23 12 53.03	2.1698	10 6 58.6	12.392	7	0 53 19.17	2.0344	0 18 12.2	13.186
8	23 15 3.10	2.1659	9 54 33.6	12.439	8	0 55 21.19	2.0328	0 31 23.0	13.173
9	23 17 12.94	2.1621	9 42 5.9	12.483	9	0 57 23.11	2.0312	0 44 33.0	13.160
10	23 19 22.55	2.1582	9 29 35.6	12.527	10	0 59 24.94	2.0298	0 57 42.2	13.147
11	23 21 31.93	2.1544	9 17 2.7	12.569	11	1 1 26.69	2.0284	1 10 50.6	13.131
12	23 23 41.08	2.1506	9 4 27.3	12.610	12	1 3 28.35	2.0270	1 23 58.0	13.114
13	23 25 50.00	2.1468	8 51 49.5	12.649	13	1 5 29.93	2.0258	1 37 4.3	13.097
14	23 27 58.70	2.1431	8 39 9.4	12.687	14	1 7 31.44	2.0246	1 50 9.6	13.078
15	23 30 7.17	2.1394	8 26 27.0	12.725	15	1 9 32.88	2.0234	2 3 13.7	13.058
16	23 32 15.43	2.1358	8 13 42.4	12.761	16	1 11 34.25	2.0222	2 16 16.6	13.037
17	23 34 23.47	2.1322	8 0 55.7	12.795	17	1 13 35.55	2.0211	2 29 18.2	13.016
18	23 36 31.30	2.1287	7 48 7.0	12.828	18	1 15 36.78	2.0200	2 42 18.5	12.993
19	23 38 38.92	2.1252	7 35 16.3	12.860	19	1 17 37.95	2.0191	2 55 17.4	12.969
20	23 40 46.33	2.1218	7 22 23.8	12.890	20	1 19 39.07	2.0182	3 8 14.8	12.944
21	23 42 53.54	2.1185	7 9 29.5	12.919	21	1 21 40.13	2.0172	3 21 10.7	12.918
22	23 45 0.55	2.1151	6 56 33.5	12.947	22	1 23 41.13	2.0163	3 34 5.0	12.892
23	23 47 7.36	2.1118	6 43 35.8	12.974	23	1 25 42.09	2.0156	3 46 57.7	12.864
24	23 49 13.97	2.1086	S. 6 30 36.6	12.999	24	1 27 43.00	2.0148	N. 3 59 48.7	12.835

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

WEDNESDAY 9.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	1 27 43.00	2.0148	N. 3 59 48.7	12.835
1	1 29 43.87	2.0141	4 12 37.9	12.805
2	1 31 44.70	2.0134	4 25 25.3	12.775
3	1 33 45.48	2.0128	4 38 10.9	12.743
4	1 35 46.23	2.0123	4 50 54.5	12.710
5	1 37 46.95	2.0118	5 3 36.1	12.676
6	1 39 47.64	2.0113	5 16 15.6	12.641
7	1 41 48.30	2.0108	5 28 53.0	12.606
8	1 43 48.94	2.0105	5 41 28.3	12.570
9	1 45 49.56	2.0102	5 54 1.4	12.532
10	1 47 50.16	2.0099	6 6 32.2	12.494
11	1 49 50.75	2.0097	6 19 0.7	12.454
12	1 51 51.32	2.0094	6 31 26.7	12.413
13	1 53 51.88	2.0092	6 43 50.3	12.373
14	1 55 52.43	2.0092	6 56 11.5	12.332
15	1 57 52.98	2.0091	7 8 30.1	12.288
16	1 59 53.52	2.0091	7 20 46.1	12.244
17	2 1 54.07	2.0092	7 32 59.4	12.199
18	2 3 54.62	2.0092	7 45 10.0	12.154
19	2 5 55.18	2.0093	7 57 17.9	12.108
20	2 7 55.74	2.0094	8 9 23.0	12.060
21	2 9 56.31	2.0096	8 21 25.1	12.011
22	2 11 56.89	2.0098	8 33 24.3	11.962
23	2 13 57.49	2.0101	N. 8 45 20.6	11.913

THURSDAY 10.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	2 15 58.10	2.0104	N. 8 57 13.9	11.862
1	2 17 58.73	2.0108	9 9 4.1	11.811
2	2 19 59.39	2.0112	9 20 51.2	11.758
3	2 22 0.07	2.0116	9 32 35.1	11.705
4	2 24 0.78	2.0120	9 44 15.8	11.651
5	2 26 1.51	2.0124	9 55 53.2	11.596
6	2 28 2.27	2.0130	10 7 27.3	11.540
7	2 30 3.07	2.0136	10 18 58.0	11.483
8	2 32 3.90	2.0142	10 30 25.3	11.426
9	2 34 4.77	2.0148	10 41 49.1	11.368
10	2 36 5.68	2.0155	10 53 9.4	11.309
11	2 38 6.63	2.0162	11 4 26.2	11.250
12	2 40 7.62	2.0169	11 15 39.4	11.189
13	2 42 8.66	2.0176	11 26 48.9	11.128
14	2 44 9.74	2.0184	11 37 54.7	11.066
15	2 46 10.87	2.0193	11 48 56.8	11.003
16	2 48 12.05	2.0202	11 59 55.1	10.939
17	2 50 13.29	2.0211	12 10 49.5	10.875
18	2 52 14.58	2.0220	12 21 40.1	10.810
19	2 54 15.93	2.0230	12 32 26.7	10.744
20	2 56 17.34	2.0239	12 43 9.3	10.678
21	2 58 18.80	2.0248	12 53 48.0	10.611
22	3 0 20.32	2.0259	13 4 22.6	10.542
23	3 2 21.91	2.0271	13 14 53.1	10.473
24	3 4 23.57	2.0282	N.13 25 19.4	10.403

FRIDAY 11.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	3 4 23.57	2.0282	N.13 25 19.4	10.403
1	3 6 25.29	2.0292	13 35 41.5	10.333
2	3 8 27.08	2.0303	13 45 59.4	10.263
3	3 10 28.93	2.0314	13 56 13.1	10.192
4	3 12 30.85	2.0327	14 6 22.5	10.120
5	3 14 32.85	2.0340	14 16 27.5	10.047
6	3 16 34.93	2.0352	14 26 28.1	9.973
7	3 18 37.08	2.0364	14 36 24.3	9.899
8	3 20 39.30	2.0377	14 46 16.0	9.824
9	3 22 41.60	2.0390	14 56 3.2	9.748
10	3 24 43.98	2.0402	15 5 45.8	9.672
11	3 26 46.43	2.0415	15 15 23.8	9.596
12	3 28 48.96	2.0429	15 24 57.3	9.519
13	3 30 51.58	2.0443	15 34 26.1	9.440
14	3 32 54.28	2.0457	15 43 50.1	9.361
15	3 34 57.06	2.0471	15 53 9.4	9.282
16	3 36 59.93	2.0485	16 2 23.9	9.202
17	3 39 2.88	2.0498	16 11 33.6	9.121
18	3 41 5.91	2.0512	16 20 38.4	9.039
19	3 43 9.03	2.0527	16 29 38.3	8.957
20	3 45 12.24	2.0542	16 38 33.3	8.875
21	3 47 15.54	2.0557	16 47 23.3	8.792
22	3 49 18.93	2.0572	16 56 8.3	8.709
23	3 51 22.41	2.0587	N.17 4 48.3	8.625

SATURDAY 12.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	3 53 25.97	2.0602	N.17 13 23.3	8.540
1	3 55 29.63	2.0617	17 21 53.1	8.454
2	3 57 33.38	2.0632	17 30 17.8	8.368
3	3 59 37.22	2.0647	17 38 37.3	8.282
4	4 1 41.15	2.0662	17 46 51.6	8.195
5	4 3 45.17	2.0678	17 55 0.7	8.107
6	4 5 49.29	2.0694	18 3 4.5	8.019
7	4 7 53.50	2.0709	18 11 3.0	7.930
8	4 9 57.80	2.0725	18 18 56.1	7.841
9	4 12 2.20	2.0741	18 26 43.9	7.752
10	4 14 6.69	2.0756	18 34 26.3	7.661
11	4 16 11.27	2.0772	18 42 3.2	7.570
12	4 18 15.95	2.0787	18 49 34.7	7.479
13	4 20 20.72	2.0802	18 57 0.7	7.387
14	4 22 25.58	2.0818	19 4 21.2	7.295
15	4 24 30.54	2.0834	19 11 36.1	7.202
16	4 26 35.59	2.0849	19 18 45.4	7.108
17	4 28 40.73	2.0865	19 25 49.1	7.015
18	4 30 45.97	2.0881	19 32 47.2	6.921
19	4 32 51.30	2.0896	19 39 39.6	6.826
20	4 34 56.72	2.0912	19 46 26.3	6.732
21	4 37 2.24	2.0927	19 53 7.4	6.637
22	4 39 7.84	2.0942	19 59 42.7	6.540
23	4 41 13.54	2.0957	20 6 12.2	6.442
24	4 43 19.33	2.0972	N.20 12 35.8	6.345

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SUNDAY 13.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	4 43 19.33	2.0972	N.20 12 35.8	6.345
1	4 45 25.21	2.0987	20 18 53.6	6.248
2	4 47 31.18	2.1002	20 25 5.6	6.151
3	4 49 37.24	2.1017	20 31 11.7	6.053
4	4 51 43.38	2.1031	20 37 11.9	5.954
5	4 53 49.61	2.1046	20 43 6.2	5.856
6	4 55 55.93	2.1060	20 48 54.6	5.757
7	4 58 2.33	2.1074	20 54 37.0	5.657
8	5 0 8.82	2.1089	21 0 13.4	5.556
9	5 2 15.40	2.1103	21 5 43.7	5.455
10	5 4 22.06	2.1117	21 11 8.0	5.355
11	5 6 28.80	2.1131	21 16 26.3	5.254
12	5 8 35.63	2.1145	21 21 38.5	5.152
13	5 10 42.54	2.1158	21 26 44.6	5.050
14	5 12 49.52	2.1170	21 31 44.5	4.947
15	5 14 56.58	2.1183	21 36 38.3	4.845
16	5 17 3.72	2.1196	21 41 25.9	4.742
17	5 19 10.94	2.1209	21 46 7.3	4.639
18	5 21 18.23	2.1221	21 50 42.6	4.536
19	5 23 25.59	2.1233	21 55 11.6	4.432
20	5 25 33.03	2.1246	21 59 34.4	4.327
21	5 27 40.54	2.1258	22 3 50.9	4.222
22	5 29 48.12	2.1269	22 8 1.1	4.117
23	5 31 55.77	2.1280	N.22 12 5.0	4.012

MONDAY 14.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	5 34 3.48	2.1291	N.22 16 2.6	3.907
1	5 36 11.26	2.1302	22 19 53.9	3.802
2	5 38 19.10	2.1312	22 23 38.8	3.696
3	5 40 27.01	2.1323	22 27 17.4	3.590
4	5 42 34.98	2.1333	22 30 49.6	3.483
5	5 44 43.01	2.1342	22 34 15.4	3.377
6	5 46 51.09	2.1352	22 37 34.9	3.271
7	5 48 59.23	2.1362	22 40 47.9	3.164
8	5 51 7.43	2.1371	22 43 54.5	3.056
9	5 53 15.68	2.1379	22 46 54.6	2.948
10	5 55 23.98	2.1387	22 49 48.3	2.841
11	5 57 32.33	2.1396	22 52 35.5	2.733
12	5 59 40.73	2.1404	22 55 16.3	2.626
13	6 1 49.18	2.1411	22 57 50.6	2.517
14	6 3 57.67	2.1418	23 0 18.4	2.408
15	6 6 6.20	2.1425	23 2 39.6	2.299
16	6 8 14.77	2.1432	23 4 54.3	2.191
17	6 10 23.38	2.1438	23 7 2.5	2.082
18	6 12 32.03	2.1444	23 9 4.2	1.973
19	6 14 40.71	2.1450	23 10 59.3	1.864
20	6 16 49.43	2.1456	23 12 47.9	1.755
21	6 18 58.18	2.1461	23 14 29.9	1.645
22	6 21 6.96	2.1465	23 16 5.3	1.536
23	6 23 15.76	2.1469	23 17 34.2	1.427
24	6 25 24.59	2.1473	N.23 18 56.5	1.317

TUESDAY 15.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	6 25 24.59	2.1473	N.23 18 56.5	1.317
1	6 27 33.44	2.1477	23 20 12.2	1.207
2	6 29 42.31	2.1481	23 21 21.3	1.097
3	6 31 51.21	2.1484	23 22 23.8	0.987
4	6 34 0.12	2.1487	23 23 19.7	0.877
5	6 36 9.05	2.1490	23 24 9.0	0.767
6	6 38 18.00	2.1492	23 24 51.7	0.657
7	6 40 26.96	2.1493	23 25 27.8	0.547
8	6 42 35.92	2.1494	23 25 57.3	0.437
9	6 44 44.89	2.1496	23 26 20.2	0.326
10	6 46 53.87	2.1497	23 26 36.4	0.215
11	6 49 2.85	2.1497	23 26 46.0	+ 0.105
12	6 51 11.84	2.1497	23 26 49.0	- 0.005
13	6 53 20.82	2.1497	23 26 45.4	0.115
14	6 55 29.80	2.1497	23 26 35.2	0.226
15	6 57 38.78	2.1496	23 26 18.3	0.337
16	6 59 47.75	2.1494	23 25 54.8	0.447
17	7 1 56.71	2.1492	23 25 24.7	0.557
18	7 4 5.66	2.1491	23 24 48.0	0.667
19	7 6 14.60	2.1489	23 24 4.7	0.777
20	7 8 23.53	2.1486	23 23 14.8	0.888
21	7 10 32.44	2.1483	23 22 18.2	0.998
22	7 12 41.33	2.1480	23 21 15.0	1,107
23	7 14 50.20	2.1476	N.23 20 5.3	1.217

WEDNESDAY 16.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	7 16 59.05	2.1472	N.23 18 49.0	1.327
1	7 19 7.87	2.1468	23 17 26.1	1.437
2	7 21 16.67	2.1465	23 15 56.6	1.547
3	7 23 25.45	2.1461	23 14 20.5	1.657
4	7 25 34.20	2.1455	23 12 37.8	1.766
5	7 27 42.91	2.1449	23 10 48.6	1.875
6	7 29 51.59	2.1444	23 8 52.8	1.985
7	7 32 0.24	2.1438	23 6 50.4	2.094
8	7 34 8.85	2.1432	23 4 41.5	2.202
9	7 36 17.42	2.1425	23 2 26.1	2.311
10	7 38 25.95	2.1418	23 0 4.2	2.420
11	7 40 34.44	2.1411	22 57 35.7	2.529
12	7 42 42.89	2.1404	22 55 0.7	2.638
13	7 44 51.29	2.1397	22 52 19.2	2.746
14	7 46 59.65	2.1389	22 49 31.2	2.853
15	7 49 7.96	2.1381	22 46 36.8	2.961
16	7 51 16.22	2.1372	22 43 35.9	3.069
17	7 53 24.43	2.1363	22 40 28.5	3.177
18	7 55 32.58	2.1354	22 37 14.7	3.284
19	7 57 40.68	2.1346	22 33 54.5	3.391
20	7 59 48.73	2.1337	22 30 27.8	3.498
21	8 1 56.72	2.1327	22 26 54.7	3.605
22	8 4 4.65	2.1317	22 23 15.2	3.711
23	8 6 12.52	2.1307	22 19 29.3	3.817
24	8 8 20.33	2.1297	N.22 15 37.1	3.922

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	THURSDAY 17.					SATURDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	8 8 20.33	2.1297	N.22 15 37.1	3.922	0	9 49 8.25	2.0688	N.17 11 7.8	8.617
1	8 10 28.08	2.1286	22 11 38.6	4.028	1	9 51 12.34	2.0676	17 2 28.2	8.704
2	8 12 35.76	2.1275	22 7 33.7	4.135	2	9 53 16.36	2.0663	16 53 43.4	8.791
3	8 14 43.38	2.1265	22 3 22.4	4.241	3	9 55 20.30	2.0651	16 44 53.3	8.877
4	8 16 50.94	2.1254	21 59 4.8	4.345	4	9 57 24.17	2.0640	16 35 58.1	8.962
5	8 18 58.43	2.1242	21 54 41.0	4.449	5	9 59 27.98	2.0629	16 26 57.8	9.047
6	8 21 5.85	2.1231	21 50 10.9	4.554	6	10 1 31.72	2.0617	16 17 52.4	9.132
7	8 23 13.20	2.1219	21 45 34.5	4.658	7	10 3 35.39	2.0606	16 8 41.9	9.217
8	8 25 20.48	2.1207	21 40 51.9	4.762	8	10 5 38.99	2.0595	15 59 26.4	9.300
9	8 27 27.69	2.1196	21 36 3.1	4.865	9	10 7 42.53	2.0584	15 50 5.9	9.383
10	8 29 34.83	2.1184	21 31 8.1	4.969	10	10 9 46.00	2.0573	15 40 40.4	9.466
11	8 31 41.90	2.1172	21 26 6.9	5.072	11	10 11 49.41	2.0563	15 31 10.0	9.548
12	8 33 48.89	2.1159	21 20 59.5	5.174	12	10 13 52.76	2.0553	15 21 34.7	9.629
13	8 35 55.81	2.1147	21 15 46.0	5.277	13	10 15 56.05	2.0543	15 11 54.5	9.710
14	8 38 2.65	2.1134	21 10 26.3	5.379	14	10 17 59.28	2.0533	15 2 9.5	9.790
15	8 40 9.42	2.1122	21 5 0.5	5.481	15	10 20 2.45	2.0524	14 52 19.7	9.869
16	8 42 16.11	2.1109	20 59 28.6	5.582	16	10 22 5.57	2.0516	14 42 25.2	9.947
17	8 44 22.72	2.1096	20 53 50.6	5.683	17	10 24 8.64	2.0507	14 32 26.0	10.026
18	8 46 29.26	2.1083	20 48 6.6	5.783	18	10 26 11.65	2.0498	14 22 22.1	10.104
19	8 48 35.72	2.1070	20 42 16.6	5.883	19	10 28 14.61	2.0489	14 12 13.5	10.182
20	8 50 42.10	2.1057	20 36 20.6	5.984	20	10 30 17.52	2.0481	14 2 0.3	10.258
21	8 52 48.40	2.1043	20 30 18.5	6.084	21	10 32 20.38	2.0473	13 51 42.5	10.334
22	8 54 54.62	2.1030	20 24 10.5	6.183	22	10 34 23.20	2.0466	13 41 20.2	10.409
23	8 57 0.76	2.1018	N.20 17 56.6	6.282	23	10 36 25.97	2.0458	N.13 30 53.4	10.483
	FRIDAY 18.					SUNDAY 20.			
0	8 59 6.83	2.1005	N.20 11 36.7	6.381	0	10 38 28.70	2.0451	N.13 20 22.2	10.557
1	9 1 12.82	2.0991	20 5 10.9	6.479	1	10 40 31.39	2.0445	13 9 46.6	10.630
2	9 3 18.72	2.0977	19 58 39.3	6.576	2	10 42 34.04	2.0438	12 59 6.6	10.703
3	9 5 24.54	2.0963	19 52 1.8	6.673	3	10 44 36.65	2.0432	12 48 22.2	10.776
4	9 7 30.28	2.0950	19 45 18.5	6.770	4	10 46 39.23	2.0427	12 37 33.5	10.847
5	9 9 35.94	2.0936	19 38 29.4	6.867	5	10 48 41.78	2.0421	12 26 40.5	10.918
6	9 11 41.51	2.0922	19 31 34.5	6.963	6	10 50 44.29	2.0416	12 15 43.3	10.987
7	9 13 47.00	2.0909	19 24 33.8	7.059	7	10 52 46.77	2.0412	12 4 42.0	11.056
8	9 15 52.41	2.0896	19 17 27.4	7.154	8	10 54 49.23	2.0407	11 53 36.6	11.125
9	9 17 57.75	2.0883	19 10 15.3	7.249	9	10 56 51.66	2.0403	11 42 27.0	11.193
10	9 20 3.01	2.0869	19 2 57.5	7.343	10	10 58 54.07	2.0400	11 31 13.4	11.260
11	9 22 8.18	2.0855	18 55 34.1	7.437	11	11 0 56.46	2.0397	11 19 55.8	11.327
12	9 24 13.27	2.0842	18 48 5.1	7.530	12	11 2 58.83	2.0394	11 8 34.2	11.392
13	9 26 18.28	2.0829	18 40 30.5	7.623	13	11 5 1.19	2.0391	10 57 8.7	11.457
14	9 28 23.21	2.0816	18 32 50.3	7.716	14	11 7 3.53	2.0389	10 45 39.3	11.522
15	9 30 28.07	2.0802	18 25 4.5	7.809	15	11 9 5.86	2.0388	10 34 6.1	11.585
16	9 32 32.84	2.0789	18 17 13.2	7.901	16	11 11 8.18	2.0387	10 22 29.1	11.647
17	9 34 37.53	2.0776	18 9 16.4	7.992	17	11 13 10.50	2.0386	10 10 48.4	11.709
18	9 36 42.15	2.0763	18 1 14.2	8.083	18	11 15 12.81	2.0385	9 59 4.0	11.771
19	9 38 46.69	2.0750	17 53 6.5	8.173	19	11 17 15.12	2.0385	9 47 15.9	11.831
20	9 40 51.15	2.0737	17 44 53.4	8.262	20	11 19 17.43	2.0385	9 35 24.3	11.890
21	9 42 55.54	2.0725	17 36 35.0	8.351	21	11 21 19.74	2.0386	9 23 29.1	11.949
22	9 44 59.85	2.0712	17 28 11.3	8.440	22	11 23 22.06	2.0367	9 11 30.4	12.007
23	9 47 4.09	2.0700	17 19 42.2	8.529	23	11 25 24.39	2.0388	8 59 28.2	12.065
24	9 49 8.25	2.0688	N.17 11 7.8	8.617	24	11 27 26.72	2.0390	N. 8 47 22.6	12.122

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

MONDAY 21.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	11 27 26.72	2.0390	N. 8 47 22.6	12.122
1	11 29 29.07	2.0393	8 35 13.6	12.177
2	11 31 31.44	2.0396	8 23 1.3	12.232
3	11 33 33.82	2.0399	8 10 45.8	12.285
4	11 35 36.23	2.0403	7 58 27.1	12.338
5	11 37 38.66	2.0407	7 46 5.2	12.391
6	11 39 41.12	2.0412	7 33 40.2	12.442
7	11 41 43.61	2.0417	7 21 12.1	12.493
8	11 43 46.13	2.0423	7 8 41.0	12.542
9	11 45 48.69	2.0429	6 56 7.0	12.591
10	11 47 51.28	2.0436	6 43 30.1	12.639
11	11 49 53.92	2.0443	6 30 50.3	12.686
12	11 51 56.60	2.0450	6 18 7.8	12.731
13	11 53 59.32	2.0458	6 5 22.6	12.776
14	11 56 2.10	2.0467	5 52 34.7	12.821
15	11 58 4.93	2.0476	5 39 44.1	12.865
16	12 0 7.81	2.0486	5 26 50.9	12.907
17	12 2 10.76	2.0497	5 13 55.2	12.948
18	12 4 13.77	2.0507	5 0 57.1	12.988
19	12 6 16.84	2.0518	4 47 56.6	13.027
20	12 8 19.98	2.0529	4 34 53.8	13.066
21	12 10 23.19	2.0541	4 21 48.7	13.103
22	12 12 26.48	2.0554	4 8 41.4	13.140
23	12 14 29.84	2.0567	N. 3 55 31.9	13.175

TUESDAY 22.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	12 16 33.28	2.0580	N. 3 42 20.4	13.209
1	12 18 36.80	2.0594	3 29 6.8	13.243
2	12 20 40.41	2.0610	3 15 51.2	13.276
3	12 22 44.12	2.0626	3 2 33.7	13.307
4	12 24 47.92	2.0642	2 49 14.4	13.336
5	12 26 51.82	2.0658	2 35 53.4	13.364
6	12 28 55.81	2.0674	2 22 30.7	13.392
7	12 30 59.91	2.0691	2 9 6.3	13.420
8	12 33 4.11	2.0709	1 55 40.3	13.447
9	12 35 8.42	2.0727	1 42 12.7	13.471
10	12 37 12.84	2.0747	1 28 43.7	13.494
11	12 39 17.38	2.0767	1 15 13.4	13.517
12	12 41 22.04	2.0787	1 1 41.7	13.539
13	12 43 26.82	2.0808	0 48 8.7	13.559
14	12 45 31.73	2.0829	0 34 34.6	13.577
15	12 47 36.77	2.0851	0 20 59.4	13.595
16	12 49 41.94	2.0873	N. 0 7 23.2	13.612
17	12 51 47.25	2.0896	S. 0 6 14.0	13.627
18	12 53 52.69	2.0919	0 19 52.1	13.642
19	12 55 58.28	2.0944	0 33 31.0	13.655
20	12 58 4.02	2.0968	0 47 10.7	13.667
21	13 0 9.90	2.0993	1 0 51.0	13.677
22	13 2 15.94	2.1019	1 14 31.9	13.687
23	13 4 22.13	2.1045	1 28 13.4	13.695
24	13 6 28.48	2.1072	S. 1 41 55.3	13.702

WEDNESDAY 23.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	13 6 28.48	2.1072	S. 1 41 55.3	13.702
1	13 8 34.99	2.1099	1 55 37.6	13.707
2	13 10 41.67	2.1127	2 9 20.2	13.712
3	13 12 48.52	2.1156	2 23 3.0	13.714
4	13 14 55.54	2.1185	2 36 45.9	13.716
5	13 17 2.74	2.1215	2 50 28.9	13.717
6	13 19 10.12	2.1245	3 4 11.9	13.716
7	13 21 17.68	2.1276	3 17 54.8	13.713
8	13 23 25.43	2.1307	3 31 37.5	13.710
9	13 25 33.36	2.1339	3 45 20.0	13.706
10	13 27 41.49	2.1371	3 59 2.2	13.699
11	13 29 49.81	2.1403	4 12 43.9	13.691
12	13 31 58.33	2.1437	4 26 25.1	13.682
13	13 34 7.05	2.1471	4 40 5.7	13.672
14	13 36 15.98	2.1506	4 53 45.7	13.660
15	13 38 25.12	2.1541	5 7 24.9	13.646
16	13 40 34.47	2.1576	5 21 3.2	13.632
17	13 42 44.03	2.1612	5 34 40.7	13.617
18	13 44 53.81	2.1648	5 48 17.2	13.599
19	13 47 3.81	2.1686	6 1 52.6	13.580
20	13 49 14.04	2.1723	6 15 26.8	13.559
21	13 51 24.49	2.1761	6 28 59.7	13.537
22	13 53 35.17	2.1800	6 42 31.2	13.513
23	13 55 46.09	2.1839	S. 6 56 1.3	13.489

THURSDAY 24.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	13 57 57.24	2.1878	S. 7 9 29.9	13.463
1	14 0 8.63	2.1918	7 22 56.9	13.436
2	14 2 20.26	2.1959	7 36 22.2	13.406
3	14 4 32.14	2.2000	7 49 45.6	13.374
4	14 6 44.26	2.2041	8 3 7.1	13.342
5	14 8 56.63	2.2084	8 16 26.7	13.309
6	14 11 9.26	2.2127	8 29 44.2	13.273
7	14 13 22.15	2.2169	8 42 59.5	13.237
8	14 15 35.29	2.2212	8 56 12.6	13.198
9	14 17 48.69	2.2255	9 9 23.3	13.158
10	14 20 2.35	2.2299	9 22 31.6	13.117
11	14 22 16.28	2.2344	9 35 37.3	13.073
12	14 24 30.48	2.2389	9 48 40.4	13.029
13	14 26 44.95	2.2434	10 1 40.8	12.983
14	14 28 59.69	2.2480	10 14 38.4	12.935
15	14 31 14.71	2.2527	10 27 33.0	12.885
16	14 33 30.01	2.2573	10 40 24.6	12.834
17	14 35 45.59	2.2619	10 53 13.1	12.782
18	14 38 1.44	2.2666	11 5 58.5	12.728
19	14 40 17.58	2.2714	11 18 40.5	12.672
20	14 42 34.01	2.2762	11 31 19.1	12.615
21	14 44 50.72	2.2809	11 43 54.3	12.556
22	14 47 7.72	2.2857	11 56 25.8	12.494
23	14 49 25.01	2.2906	12 8 53.6	12.432
24	14 51 42.60	2.2956	S. 12 21 17.7	12.369

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

FRIDAY 25.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	14 51 42.60	2.2956	S. 12 21 17.7	12.369
1	14 54 0.48	2.3005	12 33 37.9	12.303
2	14 56 18.66	2.3054	12 45 54.1	12.236
3	14 58 37.13	2.3103	12 58 6.2	12.167
4	15 0 55.90	2.3153	13 10 14.1	12.097
5	15 3 14.97	2.3204	13 22 17.8	12.025
6	15 5 34.35	2.3255	13 34 17.1	11.951
7	15 7 54.03	2.3305	13 46 11.9	11.876
8	15 10 14.01	2.3355	13 58 2.2	11.799
9	15 12 34.29	2.3406	14 9 47.8	11.720
10	15 14 54.88	2.3457	14 21 28.6	11.640
11	15 17 15.77	2.3508	14 33 4.6	11.558
12	15 19 36.97	2.3559	14 44 35.6	11.475
13	15 21 58.48	2.3610	14 56 1.6	11.390
14	15 24 20.29	2.3661	15 7 22.4	11.302
15	15 26 42.41	2.3712	15 18 37.9	11.214
16	15 29 4.84	2.3764	15 29 48.1	11.125
17	15 31 27.58	2.3815	15 40 52.9	11.033
18	15 33 50.62	2.3866	15 51 52.1	10.940
19	15 36 13.97	2.3917	16 2 45.7	10.846
20	15 38 37.63	2.3968	16 13 33.6	10.749
21	15 41 1.59	2.4019	16 24 15.6	10.651
22	15 43 25.86	2.4070	16 34 51.7	10.552
23	15 45 50.43	2.4121	S. 16 45 21.8	10.451

SATURDAY 26.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	15 48 15.31	2.4172	S. 16 55 45.8	10.348
1	15 50 40.49	2.4222	17 6 3.6	10.244
2	15 53 5.97	2.4272	17 16 15.1	10.138
3	15 55 31.76	2.4323	17 26 20.2	10.031
4	15 57 57.85	2.4373	17 36 18.8	9.922
5	16 0 24.24	2.4422	17 46 10.8	9.812
6	16 2 50.92	2.4472	17 55 56.2	9.700
7	16 5 17.90	2.4521	18 5 34.8	9.587
8	16 7 45.17	2.4570	18 15 6.6	9.472
9	16 10 12.74	2.4619	18 24 31.4	9.355
10	16 12 40.60	2.4667	18 33 49.2	9.237
11	16 15 8.74	2.4714	18 42 59.9	9.118
12	16 17 37.17	2.4761	18 52 3.4	8.998
13	16 20 5.88	2.4808	19 0 59.6	8.876
14	16 22 34.87	2.4855	19 9 48.5	8.752
15	16 25 4.14	2.4901	19 18 29.9	8.627
16	16 27 33.68	2.4947	19 27 3.8	8.501
17	16 30 3.50	2.4993	19 35 30.0	8.372
18	16 32 33.59	2.5037	19 43 48.5	8.243
19	16 35 3.94	2.5080	19 51 59.3	8.114
20	16 37 34.55	2.5124	20 0 2.2	7.982
21	16 40 5.43	2.5167	20 7 57.1	7.849
22	16 42 36.56	2.5208	20 15 44.0	7.715
23	16 45 7.93	2.5249	20 23 22.9	7.580
24	16 47 39.56	2.5290	S. 20 30 53.6	7.442

SUNDAY 27.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	16 47 39.55	2.5290	S. 20 30 53.6	7.442
1	16 50 11.41	2.5330	20 38 16.0	7.304
2	16 52 43.51	2.5370	20 45 30.1	7.166
3	16 55 15.85	2.5409	20 52 35.9	7.027
4	16 57 48.42	2.5447	20 59 33.3	6.886
5	17 0 21.21	2.5483	21 6 22.2	6.743
6	17 2 54.22	2.5519	21 13 2.5	6.599
7	17 5 27.44	2.5555	21 19 34.1	6.454
8	17 8 0.88	2.5590	21 25 57.0	6.309
9	17 10 34.52	2.5623	21 32 11.2	6.162
10	17 13 8.36	2.5656	21 38 16.5	6.014
11	17 15 42.39	2.5688	21 44 12.9	5.866
12	17 18 16.61	2.5719	21 50 0.4	5.717
13	17 20 51.02	2.5749	21 55 38.9	5.566
14	17 23 25.60	2.5778	22 1 8.3	5.414
15	17 26 0.35	2.5806	22 6 28.6	5.262
16	17 28 35.27	2.5833	22 11 39.7	5.109
17	17 31 10.35	2.5859	22 16 41.7	4.956
18	17 33 45.58	2.5883	22 21 34.4	4.801
19	17 36 20.95	2.5907	22 26 17.8	4.646
20	17 38 56.46	2.5930	22 30 51.9	4.490
21	17 41 32.11	2.5952	22 35 16.6	4.333
22	17 44 7.88	2.5972	22 39 31.8	4.175
23	17 46 43.77	2.5992	S. 22 43 37.6	4.017

MONDAY 28.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	17 49 19.78	2.6010	S. 22 47 33.9	3.858
1	17 51 55.89	2.6027	22 51 20.6	3.699
2	17 54 32.10	2.6043	22 54 57.8	3.540
3	17 57 8.41	2.6058	22 58 25.4	3.380
4	17 59 44.80	2.6072	23 1 43.4	3.219
5	18 2 21.27	2.6085	23 4 51.7	3.057
6	18 4 57.82	2.6097	23 7 50.3	2.896
7	18 7 34.43	2.6107	23 10 39.2	2.734
8	18 10 11.10	2.6115	23 13 18.4	2.572
9	18 12 47.81	2.6122	23 15 47.9	2.410
10	18 15 24.56	2.6128	23 18 7.6	2.247
11	18 18 1.35	2.6134	23 20 17.5	2.084
12	18 20 38.17	2.6138	23 22 17.7	1.921
13	18 23 15.01	2.6141	23 24 8.1	1.757
14	18 25 51.86	2.6142	23 25 48.6	1.593
15	18 28 28.71	2.6142	23 27 19.3	1.430
16	18 31 5.56	2.6141	23 28 40.2	1.267
17	18 33 42.40	2.6139	23 29 51.3	1.103
18	18 36 19.23	2.6136	23 30 52.6	0.940
19	18 38 56.03	2.6130	23 31 44.1	0.776
20	18 41 32.79	2.6124	23 32 25.7	0.612
21	18 44 9.52	2.6117	23 32 57.5	0.448
22	18 46 46.20	2.6108	23 33 19.5	0.285
23	18 49 22.82	2.6098	23 33 31.7	− 0.122
24	18 51 59.38	2.6087	S. 23 33 34.1	+ 0.042

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

TUESDAY 29.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	18 51 59.38	2.6087	S. 23 33 34.1	+ 0.042
1	18 54 35.87	2.6075	23 33 26.7	0.205
2	18 57 12.28	2.6062	23 33 9.5	0.367
3	18 59 48.61	2.6047	23 32 42.6	0.529
4	19 2 24.85	2.6032	23 32 6.0	0.691
5	19 5 0.99	2.6014	23 31 19.7	0.853
6	19 7 37.02	2.5996	23 30 23.7	1.014
7	19 10 12.94	2.5977	23 29 18.0	1.176
8	19 12 48.74	2.5957	23 28 2.6	1.337
9	19 15 24.42	2.5935	23 26 37.6	1.497
10	19 17 59.96	2.5912	23 25 3.0	1.656
11	19 20 35.36	2.5887	23 23 18.9	1.814
12	19 23 10.61	2.5862	23 21 25.3	1.973
13	19 25 45.71	2.5837	23 19 22.2	2.131
14	19 28 20.65	2.5809	23 17 9.6	2.288
15	19 30 55.42	2.5781	23 14 47.6	2.445
16	19 33 30.02	2.5752	23 12 16.2	2.601
17	19 36 4.44	2.5721	23 9 35.5	2.757
18	19 38 38.67	2.5689	23 6 45.4	2.912
19	19 41 12.71	2.5657	23 3 46.1	3.065
20	19 43 46.55	2.5623	23 0 37.6	3.218
21	19 46 20.19	2.5589	22 57 19.9	3.371
22	19 48 53.62	2.5554	22 53 53.1	3.522
23	19 51 26.84	2.5517	S. 22 50 17.2	3.673

WEDNESDAY 30.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	19 53 59.83	2.5480	S. 22 46 32.3	3.823
1	19 56 32.60	2.5442	22 42 38.4	3.972
2	19 59 5.14	2.5403	22 38 35.6	4.120
3	20 1 37.44	2.5363	22 34 24.0	4.267
4	20 4 9.50	2.5322	22 30 3.6	4.414
5	20 6 41.31	2.5281	22 25 34.4	4.560
6	20 9 12.87	2.5239	22 20 56.4	4.705
7	20 11 44.17	2.5196	22 16 9.8	4.847
8	20 14 15.22	2.5153	22 11 14.7	4.989
9	20 16 46.01	2.5109	22 6 11.1	5.131
10	20 19 16.53	2.5063	22 0 59.0	5.272
11	20 21 46.77	2.5017	21 55 38.5	5.411
12	20 24 16.74	2.4971	21 50 9.7	5.549
13	20 26 46.43	2.4924	21 44 32.7	5.686
14	20 29 15.83	2.4876	21 38 47.4	5.822
15	20 31 44.94	2.4827	21 32 54.0	5.957
16	20 34 13.76	2.4779	21 26 52.6	6.091
17	20 36 42.29	2.4731	21 20 43.1	6.224
18	20 39 10.53	2.4681	21 14 25.7	6.355
19	20 41 38.46	2.4630	21 8 0.5	6.485
20	20 44 6.09	2.4580	21 1 27.5	6.614
21	20 46 33.42	2.4529	20 54 46.8	6.742
22	20 49 0.44	2.4477	20 47 58.4	6.869
23	20 51 27.14	2.4424	20 41 2.5	6.994
24	20 53 53.53	2.4372	S. 20 33 59.1	7.118

THURSDAY 31.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	20 53 53.53	2.4372	S. 20 33 59.1	7.118
1	20 56 19.61	2.4320	20 26 48.3	7.242
2	20 58 45.37	2.4268	20 19 30.1	7.363
3	21 1 10.82	2.4215	20 12 4.7	7.483
4	21 3 35.95	2.4161	20 4 32.1	7.603
5	21 6 0.75	2.4107	19 56 52.3	7.722
6	21 8 25.23	2.4053	19 49 5.5	7.838
7	21 10 49.39	2.3999	19 41 11.7	7.953
8	21 13 13.22	2.3944	19 33 11.1	8.067
9	21 15 36.72	2.3889	19 25 3.7	8.180
10	21 17 59.89	2.3835	19 16 49.5	8.292
11	21 20 22.74	2.3781	19 8 28.7	8.402
12	21 22 45.26	2.3726	19 0 1.3	8.511
13	21 25 7.45	2.3671	18 51 27.4	8.618
14	21 27 29.31	2.3616	18 42 47.1	8.724
15	21 29 50.84	2.3561	18 34 0.5	8.829
16	21 32 12.04	2.3506	18 25 7.6	8.933
17	21 34 32.91	2.3450	18 16 8.5	9.036
18	21 36 53.44	2.3395	18 7 3.3	9.137
19	21 39 13.65	2.3341	17 57 52.1	9.237
20	21 41 33.53	2.3285	17 48 34.9	9.335
21	21 43 53.07	2.3229	17 39 11.9	9.432
22	21 46 12.28	2.3175	17 29 43.1	9.528
23	21 48 31.17	2.3121	S. 17 20 8.6	9.622

FRIDAY, NOVEMBER 1.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	21 50 49.73	2.3066	S. 17 10 28.5	9.714

PHASES OF THE MOON.

		d	h	m
☽ First Quarter . .	Oct.	1	13	33.1
○ Full Moon		8	13	25.6
☾ Last Quarter		16	12	37.5
● New Moon		24	2	25.9
☽ First Quarter. . . .		30	20	30.5

		d	h
☾ Perigee	Oct.	1	4.2
☾ Apogee		15	8.7
☾ Perigee		27	5.1

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Sun	W.	82° 35′ 33″	2623	84° 13′ 57″	2623	85° 52′ 21″	2624	87° 30′ 44″	2624
	Antares	W.	23 24 33	2492	25 5 58	2467	26 47 57	2447	28 30 25	2431
	Fomalhaut	E.	63 32 50	2540	61 52 32	2548	60 12 25	2557	58 32 31	2568
	α Pegasi	E.	81 12 19	2706	79 35 47	2710	77 59 21	2716	76 23 3	2723
2	Sun	W.	95 42 30	2628	97 20 47	2629	98 59 3	2631	100 37 16	2632
	Antares	W.	37 7 21	2382	38 51 21	2378	40 35 28	2373	42 19 41	2370
	Fomalhaut	E.	50 17 19	2643	48 39 22	2663	47 1 52	2686	45 24 53	2712
	α Pegasi	E.	68 24 16	2774	66 49 14	2788	65 14 30	2803	63 40 6	2820
3	Sun	W.	108 47 45	2643	110 25 41	2646	112 3 34	2649	113 41 23	2652
	Antares	W.	51 1 45	2361	52 46 16	2361	54 30 47	2361	56 15 18	2362
	Jupiter	W.	28 32 53	2345	30 17 47	2347	32 2 38	2349	33 47 26	2352
	Fomalhaut	E.	37 30 5	2900	35 57 46	2954	34 26 36	3018	32 56 45	3090
	α Pegasi	E.	55 54 25	2935	54 22 51	2965	52 51 55	2999	51 21 41	3036
4	Sun	W.	121 49 18	2671	123 26 37	2675	125 3 50	2681	126 40 56	2685
	Antares	W.	64 57 33	2368	66 41 53	2371	68 26 9	2374	70 10 21	2377
	Jupiter	W.	42 30 26	2366	44 14 49	2370	45 59 7	2374	47 43 19	2378
	α Arietis	E.	83 26 27	2470	81 44 31	2475	80 2 42	2480	78 21 1	2486
5	Antares	W.	78 50 10	2396	80 33 51	2401	82 17 25	2405	84 0 52	2411
	Jupiter	W.	56 22 51	2401	58 6 25	2405	59 49 52	2411	61 33 11	2416
	α Arietis	E.	69 54 46	2521	68 14 2	2530	66 33 30	2540	64 53 12	2550
	Aldebaran	E.	100 29 40	2368	98 45 20	2374	97 1 8	2379	95 17 3	2384
6	Jupiter	W.	70 7 44	2448	71 50 11	2455	73 32 28	2462	75 14 35	2469
	α Aquilæ	W.	51 50 45	3612	53 9 6	3566	54 28 17	3525	55 48 14	3488
	α Arietis	E.	56 35 34	2613	54 56 57	2629	53 18 41	2645	51 40 47	2663
	Aldebaran	E.	86 38 41	2415	84 55 27	2422	83 12 23	2429	81 29 30	2437
7	Jupiter	W.	83 42 26	2510	85 23 25	2519	87 4 12	2527	88 44 47	2537
	α Aquilæ	W.	62 36 52	3358	63 59 56	3342	65 23 19	3327	66 46 59	3316
	α Arietis	E.	43 38 4	2779	42 3 8	2806	40 28 51	2841	38 55 16	2876
	Aldebaran	E.	72 57 47	2477	71 16 1	2486	69 34 28	2494	67 53 7	2504
8	Jupiter	W.	97 4 21	2587	98 43 34	2598	100 22 32	2608	102 1 16	2619
	α Aquilæ	W.	73 47 56	3286	75 12 24	3285	76 36 53	3286	78 1 21	3288
	Fomalhaut	W.	38 35 33	3064	40 4 27	3039	41 33 52	3018	43 3 42	3001
	Aldebaran	E.	59 29 45	2554	57 49 47	2564	56 10 3	2575	54 30 34	2587
9	α Aquilæ	W.	85 2 38	3317	86 26 30	3326	87 50 11	3336	89 13 41	3347
	Fomalhaut	W.	50 36 52	2959	52 7 56	2956	53 39 4	2955	55 10 13	2955
	α Pegasi	W.	38 3 33	3861	39 17 32	3791	40 32 44	3727	41 49 2	3673
	Aldebaran	E.	46 17 6	2646	44 39 13	2657	43 1 36	2670	41 24 16	2683
	Pollux	E.	90 29 4	2652	88 51 20	2663	87 13 51	2675	85 36 38	2687
10	α Aquilæ	W.	96 7 33	3419	97 29 28	3436	98 51 4	3454	100 12 19	3473
	Fomalhaut	W.	62 45 31	2970	64 16 21	2977	65 47 3	2982	67 17 38	2989
	α Pegasi	W.	48 22 53	3490	49 43 28	3466	51 4 30	3446	52 25 54	3430
	Aldebaran	E.	33 21 56	2750	31 46 22	2763	30 11 6	2778	28 36 9	2793
	Pollux	E.	77 34 30	2747	75 58 53	2760	74 23 32	2772	72 48 27	2784

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Sun	W.	89° 9′ 7″	2624	90° 47′ 29″	2624	92° 25′ 51″	2626	94° 4′ 11″	2626
	Antares	W.	30 13 16	2417	31 56 26	2406	33 39 52	2397	35 23 34	2389
	Fomalhaut	E.	56 52 52	2560	55 13 29	2583	53 34 25	2608	51 55 41	2634
	α Pegasi	E.	74 46 54	2731	73 10 55	2740	71 35 8	2750	69 59 35	2761
2	Sun	W.	102 15 27	2634	103 53 36	2636	105 31 42	2638	107 9 45	2640
	Antares	W.	44 3 59	2367	45 48 21	2364	47 32 47	2363	49 17 15	2362
	Fomalhaut	E.	43 48 29	2741	42 12 43	2773	40 37 40	2810	39 3 25	2852
	α Pegasi	E.	62 6 4	2838	60 32 26	2859	58 59 15	2883	57 26 34	2908
3	Sun	W.	115 19 8	2655	116 56 48	2659	118 34 23	2663	120 11 53	2666
	Antares	W.	57 59 48	2362	59 44 17	2363	61 28 45	2365	63 13 10	2366
	Jupiter	W.	35 32 10	2355	37 16 50	2357	39 1 26	2360	40 45 58	2363
	Fomalhaut	E.	31 28 23	3175	30 1 44	3276	28 37 4	3393	27 14 40	3534
	α Pegasi	E.	49 52 13	3077	48 23 35	3123	46 55 53	3174	45 29 13	3231
4	Sun	W.	128 17 56	2691	129 54 48	2697	131 31 32	2703	133 8 8	2710
	Antares	W.	71 54 29	2380	73 38 32	2384	75 22 30	2387	77 6 23	2391
	Jupiter	W.	49 27 26	2382	51 11 27	2386	52 55 22	2391	54 39 10	2396
	α Arietis	E.	76 39 28	2492	74 58 3	2498	73 16 47	2505	71 35 41	2513
5	Antares	W.	85 44 11	2417	87 27 22	2422	89 10 25	2428	90 53 20	2434
	Jupiter	W.	63 16 23	2422	64 59 26	2428	66 42 21	2434	68 25 7	2441
	α Arietis	E.	63 13 8	2561	61 33 19	2572	59 53 46	2585	58 14 31	2599
	Aldebaran	E.	93 33 6	2390	91 49 17	2396	90 5 36	2402	88 22 4	2408
6	Jupiter	W.	76 56 32	2477	78 38 18	2485	80 19 52	2493	82 1 15	2502
	α Aquilæ	W.	57 8 52	3454	58 30 7	3426	59 51 54	3400	61 14 10	3378
	α Arietis	E.	50 3 18	2683	48 26 15	2704	46 49 40	2727	45 13 36	2751
	Aldebaran	E.	79 46 48	2444	78 4 16	2452	76 21 55	2460	74 39 45	2468
7	Jupiter	W.	90 25 9	2546	92 5 18	2556	93 45 13	2566	95 24 54	2577
	α Aquilæ	W.	68 10 52	3306	69 34 56	3298	70 59 10	3292	72 23 31	3288
	α Arietis	E.	37 22 27	2916	35 50 28	2960	34 19 25	3010	32 49 25	3067
	Aldebaran	E.	66 11 59	2514	64 31 5	2523	62 50 24	2533	61 9 57	2544
8	Jupiter	W.	103 39 45	2630	105 17 59	2642	106 55 57	2653	108 33 40	2664
	α Aquilæ	W.	79 25 47	3291	80 50 9	3295	82 14 26	3301	83 38 36	3308
	Fomalhaut	W.	44 33 53	2968	46 4 21	2977	47 35 2	2969	49 5 53	2963
	Aldebaran	E.	52 51 21	2599	51 12 24	2610	49 33 42	2621	47 55 16	2633
9	α Aquilæ	W.	90 36 58	3359	92 0 1	3372	93 23 49	3387	94 45 20	3403
	Fomalhaut	W.	56 41 22	2957	58 12 29	2958	59 43 34	2962	61 14 35	2965
	α Pegasi	W.	43 6 18	3625	44 24 25	3584	45 43 17	3548	47 2 48	3517
	Aldebaran	E.	39 47 13	2696	38 10 28	2709	36 34 0	2722	34 57 49	2736
	Pollux	E.	83 59 40	2698	82 22 58	2710	80 46 32	2723	79 10 23	2735
10	α Aquilæ	W.	101 33 13	3494	102 53 44	3515	104 13 52	3537	105 33 35	3561
	Fomalhaut	W.	68 48 5	2996	70 18 23	3004	71 48 31	3011	73 18 30	3020
	α Pegasi	W.	53 47 37	3415	55 9 36	3403	56 31 49	3393	57 54 14	3384
	Aldebaran	E.	27 1 32	2808	25 27 15	2824	23 53 18	2841	22 19 43	2859
	Pollux	E.	71 13 38	2796	69 39 5	2809	68 4 49	2821	66 30 49	2834

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
11	Fomalhaut	W.	74° 48′ 18″	3029	76° 17′ 55″	3037	77° 47′ 22″	3046	79° 16′ 38″	3056
	α Pegasi	W.	59 16 49	3378	60 39 31	3372	62 2 19	3369	63 25 11	3366
	Pollux	E.	64 57 5	2846	63 23 37	2858	61 50 24	2870	60 17 27	2882
	Regulus	E.	100 49 26	2831	99 15 39	2843	97 42 7	2854	96 8 49	2865
	Mars	E.	113 54 9	3052	112 25 0	3064	110 56 6	3075	109 27 26	3087
12	Fomalhaut	W.	86 40 2	3104	88 8 7	3114	89 36 0	3124	91 3 41	3133
	α Pegasi	W.	70 19 53	3367	71 42 47	3370	73 5 38	3372	74 28 26	3375
	Pollux	E.	52 36 31	2942	51 5 5	2953	49 33 53	2965	48 2 56	2976
	Regulus	E.	88 25 53	2920	86 53 59	2931	85 22 19	2940	83 50 51	2950
	Mars	E.	102 7 38	3144	100 40 22	3154	99 13 18	3165	97 46 27	3175
	Venus	E.	108 45 7	3376	107 22 23	3387	105 59 52	3399	104 37 34	3409
13	Fomalhaut	W.	98 19 7	3183	99 45 37	3193	101 11 55	3202	102 38 2	3212
	α Arietis	W.	37 43 41	3362	39 6 41	3345	40 30 0	3332	41 53 35	3320
	Regulus	E.	76 16 29	2995	74 46 10	3003	73 16 1	3011	71 46 2	3018
	Saturn	E.	78 39 25	3026	77 9 45	3035	75 40 16	3043	74 10 56	3050
	Mars	E.	90 35 9	3922	89 9 26	3931	87 43 54	3939	86 18 31	3947
	Venus	E.	97 49 1	3459	96 27 51	3468	95 6 51	3477	93 46 1	3485
	Sun	E.	128 16 19	3385	126 53 45	3393	125 31 21	3401	124 9 6	3408
14	α Arietis	W.	48 54 13	3982	50 18 45	3977	51 43 23	3973	53 8 6	3968
	Regulus	E.	64 18 17	3051	62 49 7	3056	61 20 3	3061	59 51 6	3065
	Saturn	E.	66 46 25	3082	65 17 54	3087	63 49 29	3091	62 21 9	3096
	Mars	E.	79 13 43	3280	77 49 8	3285	76 24 39	3290	75 0 16	3294
	Venus	E.	87 3 58	3520	85 43 56	3525	84 24 0	3530	83 4 9	3535
	Sun	E.	117 19 44	3439	115 58 12	3444	114 36 45	3449	113 15 24	3453
15	α Arietis	W.	60 12 54	3950	61 38 4	3946	63 3 19	3942	64 28 38	3939
	Aldebaran	W.	28 4 42	3096	29 32 57	3095	31 1 13	3093	32 29 31	3092
	Regulus	E.	52 27 31	3082	50 58 59	3084	49 30 30	3085	48 2 2	3087
	Saturn	E.	55 0 39	3111	53 32 43	3113	52 4 49	3114	50 36 57	3115
	Mars	E.	67 59 28	3311	66 35 29	3313	65 11 32	3313	63 47 35	3313
	Venus	E.	76 26 5	3552	75 6 38	3554	73 47 13	3555	72 27 50	3555
	Sun	E.	106 29 36	3467	105 8 35	3468	103 47 35	3469	102 26 36	3469
16	α Arietis	W.	71 36 20	3918	73 2 8	3914	74 28 1	3908	75 54 1	3903
	Aldebaran	W.	39 51 29	3081	41 20 2	3078	42 48 38	3074	44 17 19	3070
	Regulus	E.	40 39 57	3087	39 11 31	3085	37 43 3	3084	36 14 34	3082
	Saturn	E.	43 17 41	3113	41 49 47	3110	40 21 50	3109	38 53 51	3106
	Mars	E.	56 47 54	3311	55 23 55	3308	53 59 53	3306	52 35 48	3302
	Venus	E.	65 50 52	3552	64 31 25	3549	63 11 55	3545	61 52 21	3542
	Sun	E.	95 41 36	3463	94 20 31	3461	92 59 23	3457	91 38 11	3454
17	Aldebaran	W.	51 42 11	3043	53 11 31	3036	54 40 59	3030	56 10 35	3022
	Saturn	E.	31 32 59	3088	30 4 35	3083	28 36 5	3078	27 7 29	3073
	Mars	E.	45 34 16	3280	44 9 41	3274	42 44 59	3267	41 20 9	3261
	Venus	E.	55 13 24	3517	53 53 19	3510	52 33 6	3504	51 12 46	3496
	Sun	E.	84 50 57	3427	83 29 11	3421	82 7 18	3413	80 45 16	3405
18	Aldebaran	W.	63 41 8	2977	65 11 49	2967	66 42 43	2957	68 13 50	2946
	Mars	E.	34 13 58	3223	32 48 16	3214	31 22 24	3206	29 56 22	3198

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
11	Fomalhaut	W.	80° 45′ 42″	3065	82° 14′ 35″	3074	83° 43′ 16″	3084	85° 11′ 45″	3094
	α Pegasi	W.	64 48 6	3365	66 11 3	3365	67 34 0	3365	68 56 57	3365
	Pollux	E.	58 44 45	2894	57 12 19	2906	55 40 8	2918	54 8 12	2930
	Regulus	E.	94 35 45	2876	93 2 56	2887	91 30 21	2898	89 58 0	2909
	Mars	E.	107 59 0	3098	106 30 48	3110	105 2 50	3122	103 35 7	3133
12	Fomalhaut	W.	92 31 10	3143	93 58 27	3153	95 25 32	3163	96 52 25	3173
	α Pegasi	W.	75 51 11	3379	77 13 51	3384	78 36 26	3388	79 58 56	3393
	Pollux	E.	46 32 13	2988	45 1 45	2998	43 31 30	3009	42 1 29	3021
	Regulus	E.	82 19 35	2959	80 48 31	2969	79 17 39	2977	77 46 58	2987
	Mars	E.	96 19 48	3185	94 53 21	3195	93 27 6	3204	92 1 2	3214
	Venus	E.	103 15 28	3420	101 53 34	3431	100 31 52	3440	99 10 21	3450
13	Fomalhaut	W.	104 3 57	3221	105 29 41	3231	106 55 13	3241	108 20 34	3250
	α Arietis	W.	43 17 23	3312	44 41 21	3303	46 5 29	3294	47 29 47	3288
	Regulus	E.	70 16 12	3026	68 46 31	3033	67 16 59	3039	65 47 34	3045
	Saturn	E.	72 41 45	3057	71 12 43	3064	69 43 49	3070	68 15 3	3077
	Mars	E.	84 53 17	3253	83 28 11	3261	82 3 14	3268	80 38 25	3274
	Venus	E.	92 25 20	3492	91 4 47	3500	89 44 23	3507	88 24 7	3514
	Sun	E.	122 46 59	3415	121 24 59	3422	120 3 7	3428	118 41 22	3434
14	α Arietis	W.	54 32 55	3265	55 57 48	3260	57 22 46	3257	58 47 48	3253
	Regulus	E.	58 22 14	3069	56 53 27	3073	55 24 45	3076	53 56 6	3079
	Saturn	E.	60 52 54	3101	59 24 45	3104	57 56 40	3106	56 28 38	3109
	Mars	E.	73 35 58	3299	72 11 45	3302	70 47 36	3305	69 23 30	3308
	Venus	E.	81 44 24	3540	80 24 44	3544	79 5 8	3546	77 45 35	3549
	Sun	E.	111 54 7	3456	110 32 54	3460	109 11 45	3463	107 50 39	3465
15	α Arietis	W.	65 54 1	3235	67 19 29	3231	68 45 1	3227	70 10 38	3223
	Aldebaran	W.	33 57 50	3091	35 26 11	3089	36 54 34	3087	38 23 0	3084
	Regulus	E.	46 33 36	3087	45 5 11	3088	43 36 47	3087	42 8 22	3087
	Saturn	E.	49 9 6	3115	47 41 15	3115	46 13 24	3115	44 45 33	3114
	Mars	E.	62 23 39	3313	60 59 43	3313	59 35 47	3313	58 11 51	3313
	Venus	E.	71 8 27	3555	69 49 4	3555	68 29 41	3555	67 10 17	3554
	Sun	E.	101 5 37	3469	99 44 38	3468	98 23 38	3468	97 2 38	3466
16	α Arietis	W.	77 20 7	3198	78 46 19	3192	80 12 38	3185	81 39 5	3178
	Aldebaran	W.	45 46 5	3065	47 14 57	3060	48 43 55	3056	50 12 59	3049
	Regulus	E.	34 46 3	3080	33 17 29	3078	31 48 53	3076	30 20 14	3073
	Saturn	E.	37 25 49	3103	35 57 43	3100	34 29 33	3096	33 1 18	3092
	Mars	E.	51 11 39	3299	49 47 26	3294	48 23 8	3290	46 58 45	3285
	Venus	E.	60 32 43	3538	59 13 1	3534	57 53 14	3529	56 33 22	3524
	Sun	E.	90 16 55	3449	88 55 34	3445	87 34 8	3439	86 12 36	3433
17	Aldebaran	W.	57 40 20	3014	59 10 16	3005	60 40 22	2997	62 10 39	2987
	Saturn	E.	25 38 47	3069	24 9 59	3065	22 41 6	3061	21 12 9	3058
	Mars	E.	39 55 12	3254	38 30 7	3247	37 4 53	3239	35 39 30	3231
	Venus	E.	49 52 17	3488	48 31 39	3480	47 10 52	3471	45 49 55	3462
	Sun	E.	79 23 5	3396	78 0 44	3388	76 38 14	3379	75 15 34	3370
18	Aldebaran	W.	69 45 10	2935	71 16 45	2923	72 48 35	2911	74 20 40	2899
	Mars	E.	28 30 10	3189	27 3 48	3181	25 37 16	3173	24 10 35	3166

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
18	VENUS	E.	44° 28′ 48″	[illegible]	43° 7′ 30″	2441	41° 46′ 0″	[illegible]	40° 24′ 19″	[illegible]
	SUN	E.	73 52 43	[illegible]	72 29 40	2348	71 6 24	[illegible]	69 42 56	[illegible]
19	Aldebaran	W.	75 53 0	[illegible]	77 25 37	2873	78 58 30	[illegible]	80 31 40	2847
	Pollux	W.	31 57 55	2943	33 29 19	[illegible]	35 1 6	[illegible]	36 33 15	2891
	VENUS	E.	33 32 42	3363	32 9 43	3351	30 46 30	[illegible]	29 23 3	[illegible]
	SUN	E.	62 42 7	[illegible]	61 17 13	2850	59 52 3	[illegible]	58 26 37	[illegible]
20	Aldebaran	W.	88 21 59	2775	89 57 0	[illegible]	91 32 30	2748	93 7 59	2731
	Pollux	W.	44 19 30	[illegible]	45 53 51	[illegible]	47 28 33	2772	49 3 37	2755
	SUN	E.	51 15 9	[illegible]	49 47 58	3133	48 20 29	3119	46 52 42	3103
21	Pollux	W.	57 4 34	2672	58 41 52	2655	60 19 32	2638	61 57 35	[illegible]
	Regulus	W.	21 11 52	2706	22 48 24	[illegible]	24 25 26	[illegible]	26 2 58	[illegible]
	SATURN	W.	17 59 55	[illegible]	19 35 57	2765	21 12 30	[illegible]	22 49 38	[illegible]
	SUN	E.	39 29 7	[illegible]	37 59 29	2813	36 29 32	[illegible]	34 59 17	[illegible]
22	Pollux	W.	70 13 24	2541	71 53 40	[illegible]	73 34 17	2510	75 15 16	[illegible]
	Regulus	W.	34 17 23	2546	35 57 32	[illegible]	37 38 4	2519	39 19 0	[illegible]
	SATURN	W.	31 1 26	[illegible]	32 41 6	[illegible]	34 21 7	[illegible]	36 1 31	2519
	SUN	E.	27 23 59	[illegible]	25 52 13	[illegible]	24 20 17	2918	22 48 12	2907
26	SUN	W.	25 29 48	2575	27 9 17	[illegible]	28 49 2	[illegible]	30 29 0	[illegible]
	JUPITER	E.	35 30 52	[illegible]	33 43 28	[illegible]	31 56 0	[illegible]	30 8 28	[illegible]
	α Aquilæ	E.	63 54 42	[illegible]	62 26 29	[illegible]	60 58 50	[illegible]	59 31 48	3191
	Fomalhaut	E.	94 31 40	[illegible]	92 47 41	[illegible]	91 3 36	2378	89 19 31	2375
27	SUN	W.	38 50 52	[illegible]	40 31 29	[illegible]	42 12 8	[illegible]	43 52 48	[illegible]
	α Aquilæ	E.	52 28 49	[illegible]	51 7 17	[illegible]	49 47 1	[illegible]	48 28 7	[illegible]
	Fomalhaut	E.	80 38 38	2378	78 54 32	[illegible]	77 10 31	[illegible]	75 26 36	[illegible]
	α Pegasi	E.	97 43 6	[illegible]	96 4 3	[illegible]	94 24 57	[illegible]	92 45 51	[illegible]
28	SUN	W.	52 15 54	[illegible]	53 56 23	[illegible]	55 36 48	[illegible]	57 17 8	[illegible]
	Antares	W.	19 59 41	2456	21 41 56	[illegible]	23 25 0	[illegible]	25 8 41	2376
	Fomalhaut	E.	66 49 7	[illegible]	65 6 12	[illegible]	63 23 32	2450	61 41 9	[illegible]
	α Pegasi	E.	84 30 56	2610	82 52 15	2617	81 13 43	[illegible]	79 35 23	[illegible]
29	SUN	W.	65 37 17	2567	67 16 57	2573	68 56 29	[illegible]	70 35 52	[illegible]
	Antares	W.	33 52 7	2333	35 37 18	[illegible]	37 22 32	[illegible]	39 7 47	2331
	Fomalhaut	E.	53 14 17	2546	51 34 8	[illegible]	49 54 29	[illegible]	48 15 23	2618
	α Pegasi	E.	71 27 20	[illegible]	69 50 38	2716	68 14 19	2734	66 38 24	2753
30	SUN	W.	78 50 32	[illegible]	80 28 58	[illegible]	82 7 14	[illegible]	83 45 20	2644
	Antares	W.	47 53 31	2344	49 38 26	2348	51 23 15	2353	53 7 57	2359
	JUPITER	W.	21 30 19	[illegible]	23 15 18	2349	25 0 6	2357	26 44 42	[illegible]
	Fomalhaut	E.	40 9 55	[illegible]	38 35 18	[illegible]	37 1 44	[illegible]	35 29 19	2957
	α Pegasi	E.	58 45 57	2677	57 13 9	[illegible]	55 41 1	[illegible]	54 9 35	2979
31	SUN	W.	91 53 7	[illegible]	93 30 7	[illegible]	95 6 56	[illegible]	96 43 33	2710
	Antares	W.	61 49 25	[illegible]	63 33 17	[illegible]	65 16 59	2403	67 0 30	2410
	JUPITER	W.	35 24 57	[illegible]	37 8 27	[illegible]	38 51 45	2419	40 34 52	[illegible]
	α Arietis	E.	86 32 10	[illegible]	84 50 39	[illegible]	83 9 20	[illegible]	81 28 13	2514

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh	P. L. of Diff.	XXIh.	P. L. of Diff.
18	Venus	E.	39° 2′ 25″	3409	37° 40′ 19″	3398	36° 18′ 0″	3386	34° 55′ 28″	3374
	Sun	E.	68 19 14	3314	66 55 19	3302	65 31 10	3289	64 6 46	3276
19	Aldebaran	W.	82 5 7	2833	83 38 52	2818	85 12 56	2805	86 47 18	2790
	Pollux	W.	38 5 46	2873	39 38 39	2856	41 11 54	2839	42 45 31	2822
	Venus	E.	27 59 22	3314	26 35 27	3303	25 11 19	3292	23 46 59	3282
	Sun	E.	57 0 54	3208	55 34 54	3193	54 8 37	3178	52 42 2	3163
20	Aldebaran	W.	94 43 58	2715	96 20 18	2699	97 56 59	2684	99 34 1	2669
	Pollux	W.	50 39 4	2738	52 14 53	2722	53 51 4	2704	55 27 38	2688
	Sun	E.	45 24 36	3088	43 56 12	3073	42 27 29	3057	40 58 27	3043
21	Pollux	W.	63 36 0	2605	65 14 48	2589	66 53 58	2573	68 33 30	2557
	Regulus	W.	27 40 58	2620	29 19 26	2601	30 58 20	2583	32 37 39	2564
	Saturn	W.	24 27 4	2642	26 5 2	2623	27 43 26	2604	29 22 15	2587
	Sun	E.	33 28 45	2972	31 57 57	2959	30 26 53	2946	28 55 33	2935
22	Pollux	W.	76 56 36	2480	78 38 17	2465	80 20 19	2450	82 2 42	2436
	Regulus	W.	41 0 19	2480	42 42 0	2464	44 24 4	2449	46 6 29	2434
	Saturn	W.	37 42 18	2502	39 23 28	2487	41 4 59	2472	42 46 52	2457
	Sun	E.	21 16 2	2906	19 43 51	2909	18 11 44	2919	16 39 49	2935
26	Sun	W.	32 9 9	2540	33 49 26	2536	35 29 49	2532	37 10 18	2528
	Jupiter	E.	28 20 53	2234	26 33 16	2233	24 45 37	2233	22 57 58	2232
	α Aquilæ	E.	58 5 28	3231	56 39 55	3275	55 15 14	3324	53 51 30	3379
	Fomalhaut	E.	87 35 21	2375	85 51 10	2374	84 6 58	2375	82 22 47	2376
27	Sun	W.	45 33 28	2525	47 14 7	2525	48 54 45	2527	50 35 21	2529
	α Aquilæ	E.	47 10 44	3769	45 55 0	3863	44 41 3	3980	43 29 4	4110
	Fomalhaut	E.	73 42 47	2396	71 59 6	2403	70 15 35	2410	68 32 15	2419
	α Pegasi	E.	91 6 45	2593	89 27 41	2596	87 48 40	2600	86 9 45	2604
28	Sun	W.	58 57 23	2546	60 37 32	2551	62 17 34	2556	63 57 29	2561
	Antares	W.	26 52 50	2362	28 37 20	2351	30 22 5	2343	32 7 2	2337
	Fomalhaut	E.	59 59 4	2477	58 17 18	2492	56 35 54	2509	54 54 53	2527
	α Pegasi	E.	77 57 15	2645	76 19 21	2657	74 41 43	2669	73 4 22	2684
29	Sun	W.	72 15 7	2592	73 54 13	2599	75 33 9	2606	77 11 56	2614
	Antares	W.	40 53 1	2332	42 38 14	2334	44 23 24	2337	46 8 30	2340
	Fomalhaut	E.	46 36 53	2646	44 59 1	2678	43 21 51	2713	41 45 28	2750
	α Pegasi	E.	65 2 55	2775	63 27 54	2797	61 53 22	2821	60 19 22	2848
30	Sun	W.	85 23 15	2652	87 0 59	2660	88 38 33	2668	90 15 56	2677
	Antares	W.	54 52 31	2364	56 36 57	2370	58 21 15	2376	60 5 24	2382
	Jupiter	W.	28 29 7	2373	30 13 21	2380	31 57 24	2388	33 41 16	2396
	Fomalhaut	E.	33 58 12	3026	32 28 31	3105	31 0 27	3196	29 34 13	3305
	α Pegasi	E.	52 38 56	3019	51 9 7	3062	49 40 11	3109	48 12 12	3160
31	Sun	W.	98 19 59	2719	99 56 14	2728	101 32 17	2736	103 8 9	2745
	Antares	W.	68 43 51	2417	70 27 2	2424	72 10 3	2431	73 52 54	2438
	Jupiter	W.	42 17 47	2436	44 0 30	2444	45 43 2	2453	47 25 22	2460
	α Arietis	E.	79 47 19	2523	78 6 38	2533	76 26 11	2543	74 45 58	2554

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Frid.	1	14 27 29.46	9.812	S. 14 35 30.2	–47.83	16 9.93	66.99	16 19.05	0.043
Sat.	2	14 31 25.35	9.846	14 54 31.3	47.24	16 10.18	67.11	16 19.71	0.010
SUN.	3	14 35 22.04	9.879	15 13 17.8	46.62	16 10.43	67.22	16 19.58	0.023
Mon.	4	14 39 19.53	9.913	15 31 49.1	–45.98	16 10.68	67.34	16 18.65	0.057
Tues.	5	14 43 17.84	9.947	15 50 5.0	45.33	16 10.92	67.46	16 16.90	0.091
Wed.	6	14 47 16.97	9.981	16 8 5.0	44.66	16 11.16	67.58	16 14.33	0.125
Thur.	7	14 51 16.93	10.016	16 25 48.7	–43.97	16 11.40	67.70	16 10.93	0.160
Frid.	8	14 55 17.73	10.049	16 43 15.9	43.27	16 11.63	67.82	16 6.69	0.195
Sat.	9	14 59 19.38	10.084	17 0 26.1	42.55	16 11.86	67.94	16 1.61	0.230
SUN.	10	15 3 21.89	10.122	17 17 18.9	–41.82	16 12.08	68.06	15 55.67	0.266
Mon.	11	15 7 25.26	10.158	17 33 54.0	41.07	16 12.30	68.18	15 48.88	0.302
Tues.	12	15 11 29.49	10.195	17 50 10.8	40.31	16 12.52	68.30	15 41.22	0.338
Wed.	13	15 15 34.59	10.231	18 6 9.1	–39.53	16 12.73	68.42	15 32.69	0.374
Thur.	14	15 19 40.57	10.267	18 21 48.6	38.74	16 12.94	68.54	15 23.30	0.410
Frid.	15	15 23 47.41	10.303	18 37 8.7	37.93	16 13.15	68.66	15 13.05	0.446
Sat.	16	15 27 55.11	10.339	18 52 9.1	–37.10	16 13.35	68.77	15 1.94	0.482
SUN.	17	15 32 3.67	10.375	19 6 49.5	36.25	16 13.55	68.89	14 49.96	0.518
Mon.	18	15 36 13.08	10.410	19 21 9.5	35.39	16 13.75	69.00	14 37.14	0.553
Tues.	19	15 40 23.34	10.445	19 35 8.6	–34.50	16 13.94	69.12	14 23.48	0.588
Wed.	20	15 44 34.43	10.479	19 48 46.5	33.62	16 14.13	69.23	14 8.99	0.622
Thur.	21	15 48 46.34	10.513	20 2 2.7	32.71	16 14.32	69.34	13 53.68	0.666
Frid.	22	15 52 59.06	10.546	20 14 57.0	–31.79	16 14.51	69.45	13 37.56	0.689
Sat.	23	15 57 12.57	10.578	20 27 28.9	30.85	16 14.69	69.56	13 20.65	0.721
SUN.	24	16 1 26.86	10.610	20 39 38.0	29.90	16 14.87	69.67	13 2.97	0.753
Mon.	25	16 5 41.90	10.642	20 51 24.0	–28.93	16 15.05	69.77	12 44.53	0.784
Tues.	26	16 9 57.69	10.672	21 2 46.6	27.94	16 15.22	69.87	12 25.35	0.814
Wed.	27	16 14 14.18	10.701	21 13 45.4	26.94	16 15.39	69.97	12 5.47	0.843
Thur.	28	16 18 31.37	10.730	21 24 20.1	–25.93	16 15.56	70.07	11 44.90	0.872
Frid.	29	16 22 49.24	10.758	21 34 30.4	24.91	16 15.73	70.16	11 23.65	0.900
Sat.	30	16 27 7.77	10.785	21 44 15.9	23.87	16 15.89	70.25	11 1.73	0.927
SUN.	31	16 31 26.94	10.811	S. 21 53 36.3	–22.82	16 16.05	70.34	10 39.18	0.953

NOTE.—The mean time of semidiameter passing may be found by subtracting $0^{s}.19$ from the sidereal time.

The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
Frid.	1	14 27 32.13	9.813	S. 14 35 43.3	−47.83	16 19.06	0.043	14 43 51.19
Sat.	2	14 31 28.03	9.846	14 54 44.2	47.23	16 19.71	0.010	14 47 47.74
SUN.	3	14 35 24.73	9.879	15 13 30.5	46.61	16 19.57	0.023	14 51 44.30
Mon.	4	14 39 22.23	9.913	15 32 1.6	−45.97	16 18.63	0.057	14 55 40.86
Tues.	5	14 43 20.54	9.947	15 50 17.3	45.32	16 16.87	0.091	14 59 37.41
Wed.	6	14 47 19.67	9.981	16 8 17.1	44.65	16 14.29	0.125	15 3 33.96
Thur.	7	14 51 19.63	10.016	16 26 0.6	−43.96	16 10.88	0.160	15 7 30.51
Frid.	8	14 55 20.43	10.051	16 43 27.5	45.26	16 6.64	0.195	15 11 27.07
Sat.	9	14 59 22.08	10.086	17 0 37.4	42.54	16 1.55	0.230	15 15 23.63
SUN.	10	15 3 24.58	10.122	17 17 30.0	−41.81	15 55.60	0.266	15 19 20.18
Mon.	11	15 7 27.94	10.158	17 34 4.8	41.06	15 48.80	0.302	15 23 16.74
Tues.	12	15 11 32.16	10.194	17 50 21.3	40.30	15 41.13	0.338	15 27 13.29
Wed.	13	15 15 37.25	10.230	18 6 19.3	−39.52	15 32.60	0.374	15 31 9.85
Thur.	14	15 19 43.21	10.266	18 21 58.5	38.73	15 23.20	0.410	15 35 6.41
Frid.	15	15 23 50.03	10.302	18 37 18.3	37.92	15 12.94	0.446	15 39 2.97
Sat.	16	15 27 57.71	10.338	18 52 18.4	−37.09	15 1.82	0.482	15 42 59.53
SUN.	17	15 32 6.24	10.374	19 6 58.5	36.24	14 49.84	0.518	15 46 56.08
Mon.	18	15 36 15.62	10.409	19 21 18.1	35.38	14 37.01	0.553	15 50 52.63
Tues.	19	15 40 25.85	10.444	19 35 16.9	−34.49	14 23.34	0.588	15 54 49.19
Wed.	20	15 44 36.91	10.478	19 48 54.4	33.61	14 8.84	0.622	15 58 45.75
Thur.	21	15 48 48.78	10.512	20 2 10.3	32.70	13 53.52	0.666	16 2 42.30
Frid.	22	15 53 1.46	10.545	20 15 4.2	−31.78	13 37.40	0.689	16 6 38.86
Sat.	23	15 57 14.93	10.577	20 27 35.7	30.84	13 20.49	0.721	16 10 35.42
SUN.	24	16 1 29.17	10.609	20 39 44.5	29.89	13 2.81	0.753	16 14 31.98
Mon.	25	16 5 44.16	10.640	20 51 30.2	−28.92	12 44.37	0.784	16 18 28.53
Tues.	26	16 9 59.89	10.670	21 2 52.4	27.93	12 25.19	0.814	16 22 25.08
Wed.	27	16 14 16.33	10.699	21 13 50.9	26.93	12 5.31	0.843	16 26 21.64
Thur.	28	16 18 33.47	10.728	21 24 25.2	−25.92	11 44.73	0.872	16 30 18.20
Frid.	29	16 22 51.28	10.756	21 34 35.1	24.90	11 23.48	0.900	16 34 14.76
Sat.	30	16 27 9.75	10.783	21 44 20.2	23.86	11 1.56	0.927	16 38 11.31
SUN.	31	16 31 28.86	10.809	S. 21 53 40.4	−22.81	10 39.01	0.953	16 42 7.87

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 hour, + 9ˢ.8565. (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		λ	λ′					
		° ′ ″	′ ″	″	″			h m s
1	305	219 17 14.9	16 51.5	150.26	− 0.52	9.9964376	−47.5	9 14 37.70
2	306	220 17 21.9	16 58.4	150.32	0.60	9.9963240	47.0	9 10 41.79
3	307	221 17 30.5	17 6.9	150.39	0.65	9.9962118	46.4	9 6 45.89
4	308	222 17 40.6	17 16.9	150.45	− 0.67	9.9961010	−45.8	9 2 49.98
5	309	223 17 52.3	17 28.4	150.52	0.66	9.9959917	45.2	8 58 54.07
6	310	224 18 5.7	17 41.6	150.59	0.62	9.9958841	44.5	8 54 58.16
7	311	225 18 20.7	17 56.5	150.66	− 0.56	9.9957783	−43.8	8 51 2.25
8	312	226 18 37.4	18 13.1	150.73	0.47	9.9956743	43.0	8 47 6.34
9	313	227 18 55.9	18 31.5	150.80	0.36	9.9955721	42.2	8 43 10.43
10	314	228 19 16.2	18 51.6	150.88	− 0.24	9.9954718	−41.4	8 39 14.52
11	315	229 19 38.3	19 13.5	150.95	− 0.11	9.9953734	40.7	8 35 18.60
12	316	230 20 2.2	19 37.3	151.03	+ 0.02	9.9952768	39.9	8 31 22.69
13	317	231 20 28.0	20 2.9	151.11	+ 0.15	9.9951820	−39.2	8 27 26.78
14	318	232 20 55.6	20 30.4	151.19	0.27	9.9950889	38.5	8 23 30.87
15	319	233 21 25.1	20 59.7	151.27	0.36	9.9949973	37.9	8 19 34.96
16	320	234 21 56.5	21 30.9	151.35	+ 0.45	9.9949072	−37.3	8 15 39.05
17	321	235 22 29.7	22 4.0	151.43	0.49	9.9948185	36.7	8 11 43.14
18	322	236 23 4.7	22 38.9	151.50	0.50	9.9947310	36.2	8 7 47.23
19	323	237 23 41.5	23 15.5	151.57	+ 0.48	9.9946447	−35.7	8 3 51.32
20	324	238 24 20.0	23 53.8	151.64	0.43	9.9945596	35.2	7 59 55.41
21	325	239 25 0.1	24 33.7	151.70	0.35	9.9944757	34.7	7 55 59.50
22	326	240 25 41.6	25 15.1	151.76	+ 0.27	9.9943929	−34.3	7 52 3.59
23	327	241 26 24.6	25 58.0	151.82	0.15	9.9943111	33.8	7 48 7.68
24	328	242 27 8.9	26 42.1	151.87	+ 0.03	9.9942303	33.4	7 44 11.77
25	329	243 27 54.4	27 27.4	151.92	− 0.11	9.9941507	−32.9	7 40 15.86
26	330	244 28 41.0	28 13.8	151.96	0.24	9.9940724	32.4	7 36 19.95
27	331	245 29 28.7	29 1.4	152.01	0.36	9.9939955	31.8	7 32 24.04
28	332	246 30 17.4	29 50.0	152.05	− 0.46	9.9939200	−31.1	7 28 28.13
29	333	247 31 7.0	30 39.4	152.09	0.54	9.9938461	30.4	7 24 32.22
30	334	248 31 57.6	31 29.8	152.13	0.59	9.9937740	29.6	7 20 36.31
31	335	249 32 49.0	32 21.0	152.16	− 0.62	9.9937039	−28.8	7 16 40.39

NOTE.—The numbers in column λ correspond to the true equinox of the date; in column λ′, to the mean equinox of January $0^{d}.0$.

Diff. for 1 Hour,
— $9^{s}.8296$.
(Table II.)

GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	15 57.5	15 53.7	58 27.6	-1.15	58 13.6	-1.18	7 22.6	2.18	7.9
2	15 49.9	15 46.0	57 59.4	1.19	57 45.1	1.20	8 13.3	2.05	8.9
3	15 42.0	15 38.1	57 30.6	1.21	57 16.1	1.21	9 1.3	1.95	9.9
4	15 34.1	15 30.1	57 1.5	-1.22	56 46.9	-1.22	9 47.4	1.89	10.9
5	15 26.1	15 22.2	56 32.3	1.21	56 17.8	1.21	10 32.5	1.87	11.9
6	15 18.2	15 14.4	56 3.3	1.20	55 49.1	1.17	11 17.6	1.89	12.9
7	15 10.6	15 6.9	55 35.2	-1.14	55 21.7	-1.10	12 3.2	1.92	13.9
8	15 3.4	15 0.1	55 8.7	1.05	54 56.5	0.98	12 49.8	1.97	14.9
9	14 57.0	14 54.2	54 45.2	0.90	54 35.0	0.80	13 37.7	2.02	15.9
10	14 51.8	14 49.7	54 26.1	-0.69	54 18.6	-0.55	14 26.5	2.05	16.9
11	14 48.2	14 47.1	54 12.9	0.40	54 8.9	-0.25	15 15.8	2.06	17.9
12	14 46.6	14 46.7	54 7.0	-0.07	54 7.3	+0.12	16 5.1	2.04	18.9
13	14 47.3	14 48.7	54 9.8	+0.32	54 14.8	+0.52	16 53.6	2.00	19.9
14	14 50.7	14 53.5	54 22.2	0.73	54 32.3	0.95	17 41.1	1.95	20.9
15	14 56.9	15 1.0	54 44.9	1.15	55 0.0	1.36	18 27.5	1.91	21.9
16	15 5.8	15 11.2	55 17.5	+1.56	55 37.3	+1.74	19 13.2	1.89	22.9
17	15 17.2	15 23.7	55 59.3	1.91	56 23.2	2.06	19 58.6	1.90	23.9
18	15 30.6	15 37.8	56 48.6	2.17	57 15.2	2.25	20 44.6	1.94	24.9
19	15 45.3	15 52.7	57 42.5	+2.28	58 9.9	+2.27	21 32.1	2.03	25.9
20	16 0.1	16 7.1	58 36.9	2.21	59 2.9	2.09	22 22.3	2.17	26.9
21	16 13.7	16 19.7	59 27.1	1.93	59 49.0	1.70	23 16.0	2.32	27.9
22	16 24.9	16 29.1	60 8.0	+1.44	60 23.6	+1.14	δ		28.9
23	16 32.3	16 34.4	60 35.3	0.80	60 42.9	+0.46	0 13.7	2.49	0.4
24	16 35.3	16 35.0	60 46.2	+0.10	60 45.3	-0.25	1 15.1	2.62	1.4
25	16 33.7	16 31.3	60 40.3	-0.57	60 31.6	-0.87	2 18.6	2.66	2.4
26	16 28.0	16 23.9	60 19.5	1.13	60 4.6	1.34	3 21.7	2.59	3.4
27	16 19.3	16 14.1	59 47.4	1.51	59 28.4	1.64	4 22.3	2.44	4.4
28	16 8.6	16 2.8	59 8.1	-1.72	58 47.1	-1.77	5 18.9	2.26	5.4
29	15 57.0	15 51.2	58 25.7	1.79	58 4.3	1.76	6 11.2	2.10	6.4
30	15 45.5	15 39.9	57 43.3	1.73	57 22.9	1.68	7 0.0	1.97	7.4
31	15 34.6	15 29.5	57 3.2	-1.60	56 44.5	-1.53	7 46.2	1.89	8.4

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

FRIDAY 1.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	21 50 49.73	2.3066	S. 17 10 28.5	9.714
1	21 53 7.96	2.3012	17 0 42.9	9.806
2	21 55 25.87	2.2957	16 50 51.8	9.897
3	21 57 43.45	2.2903	16 40 55.3	9.986
4	22 0 0.71	2.2850	16 30 53.5	10.073
5	22 2 17.65	2.2796	16 20 46.5	10.160
6	22 4 34.26	2.2742	16 10 34.3	10.245
7	22 6 50.55	2.2689	16 0 17.1	10.328
8	22 9 6.52	2.2636	15 49 54.9	10.411
9	22 11 22.18	2.2583	15 39 27.8	10.492
10	22 13 37.52	2.2531	15 28 55.9	10.572
11	22 15 52.55	2.2478	15 18 19.2	10.651
12	22 18 7.26	2.2426	15 7 37.8	10.727
13	22 20 21.66	2.2375	14 56 51.9	10.802
14	22 22 35.76	2.2324	14 46 1.5	10.877
15	22 24 49.55	2.2273	14 35 6.6	10.951
16	22 27 3.04	2.2222	14 24 7.4	11.023
17	22 29 16.22	2.2172	14 13 3.9	11.093
18	22 31 29.10	2.2122	14 1 56.2	11.163
19	22 33 41.69	2.2073	13 50 44.4	11.231
20	22 35 53.98	2.2024	13 39 28.5	11.298
21	22 38 5.98	2.1976	13 28 8.7	11.363
22	22 40 17.69	2.1927	13 16 45.0	11.427
23	22 42 29.11	2.1879	S. 13 5 17.5	11.489

SATURDAY 2.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	22 44 40.24	2.1832	S. 12 53 46.3	11.550
1	22 46 51.09	2.1785	12 42 11.5	11.611
2	22 49 1.66	2.1739	12 30 33.0	11.671
3	22 51 11.96	2.1693	12 18 51.0	11.728
4	22 53 21.98	2.1647	12 7 5.6	11.784
5	22 55 31.73	2.1602	11 55 16.9	11.839
6	22 57 41.20	2.1557	11 43 24.9	11.894
7	22 59 50.41	2.1513	11 31 29.6	11.947
8	23 1 59.36	2.1470	11 19 31.3	11.997
9	23 4 8.05	2.1427	11 7 30.0	12.047
10	23 6 16.48	2.1384	10 55 25.7	12.097
11	23 8 24.66	2.1342	10 43 18.4	12.145
12	23 10 32.59	2.1301	10 31 8.3	12.192
13	23 12 40.27	2.1260	10 18 55.4	12.237
14	23 14 47.71	2.1219	10 6 39.9	12.280
15	23 16 54.90	2.1178	9 54 21.8	12.323
16	23 19 1.85	2.1139	9 42 1.1	12.365
17	23 21 8.57	2.1101	9 29 38.0	12.405
18	23 23 15.06	2.1063	9 17 12.5	12.445
19	23 25 21.32	2.1025	9 4 44.6	12.483
20	23 27 27.36	2.0988	8 52 14.5	12.520
21	23 29 33.17	2.0951	8 39 42.2	12.556
22	23 31 38.77	2.0915	8 27 7.8	12.591
23	23 33 44.15	2.0879	8 14 31.3	12.625
24	23 35 49.32	2.0844	S. 8 1 52.8	12.657

SUNDAY 3.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	23 35 49.32	2.0844	S. 8 1 52.8	12.657
1	23 37 54.28	2.0810	7 49 12.4	12.688
2	23 39 59.04	2.0777	7 36 30.2	12.717
3	23 42 3.60	2.0743	7 23 46.3	12.746
4	23 44 7.96	2.0710	7 11 0.7	12.774
5	23 46 12.12	2.0678	6 58 13.4	12.801
6	23 48 16.09	2.0647	6 45 24.6	12.826
7	23 50 19.88	2.0616	6 32 34.3	12.850
8	23 52 23.48	2.0585	6 19 42.6	12.873
9	23 54 26.90	2.0556	6 6 49.5	12.896
10	23 56 30.15	2.0527	5 53 55.1	12.917
11	23 58 33.22	2.0498	5 40 59.5	12.936
12	0 0 36.12	2.0469	5 28 2.8	12.954
13	0 2 38.85	2.0442	5 15 5.0	12.972
14	0 4 41.43	2.0416	5 2 6.1	12.989
15	0 6 43.85	2.0390	4 49 6.3	13.004
16	0 8 46.11	2.0364	4 36 5.6	13.019
17	0 10 48.22	2.0340	4 23 4.0	13.032
18	0 12 50.19	2.0316	4 10 1.7	13.044
19	0 14 52.01	2.0292	3 56 58.7	13.056
20	0 16 53.69	2.0268	3 43 55.0	13.066
21	0 18 55.23	2.0245	3 30 50.8	13.074
22	0 20 56.63	2.0223	3 17 46.1	13.082
23	0 22 57.91	2.0202	S. 3 4 40.9	13.089

MONDAY 4.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	0 24 59.06	2.0182	S. 2 51 35.4	13.094
1	0 27 0.09	2.0162	2 38 29.6	13.099
2	0 29 1.00	2.0142	2 25 23.5	13.104
3	0 31 1.79	2.0123	2 12 17.1	13.107
4	0 33 2.47	2.0104	1 59 10.6	13.108
5	0 35 3.04	2.0086	1 46 4.1	13.108
6	0 37 3.50	2.0068	1 32 57.6	13.108
7	0 39 3.86	2.0052	1 19 51.2	13.107
8	0 41 4.13	2.0037	1 6 44.8	13.105
9	0 43 4.30	2.0021	0 53 38.6	13.101
10	0 45 4.38	2.0006	0 40 32.7	13.096
11	0 47 4.37	1.9992	0 27 27.1	13.091
12	0 49 4.28	1.9978	0 14 21.8	13.084
13	0 51 4.11	1.9965	S. 0 1 17.0	13.077
14	0 53 3.86	1.9952	N. 0 11 47.4	13.068
15	0 55 3.53	1.9939	0 24 51.2	13.058
16	0 57 3.13	1.9928	0 37 54.4	13.048
17	0 59 2.66	1.9917	0 50 57.0	13.037
18	1 1 2.13	1.9907	1 3 58.9	13.025
19	1 3 1.54	1.9897	1 17 0.0	13.012
20	1 5 0.89	1.9888	1 30 0.3	12.997
21	1 7 0.19	1.9879	1 42 59.6	12.981
22	1 8 59.44	1.9871	1 55 58.0	12.965
23	1 10 58.64	1.9863	2 8 55.4	12.947
24	1 12 57.79	1.9855	N. 2 21 51.7	12.929

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	TUESDAY 5.					**THURSDAY 7.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	1 12 57.79	1.9855	N. 2 21 51.7	12.929	0	2 48 22.89	2.0068	N.12 3 56.0	10.986
1	1 14 56.90	1.9849	2 34 46.9	12.910	1	2 50 23.34	2.0082	12 14 53.3	10.924
2	1 16 55.98	1.9843	2 47 40.9	12.890	2	2 52 23.87	2.0096	12 25 46.9	10.862
3	1 18 55.02	1.9837	3 0 33.7	12.869	3	2 54 24.49	2.0110	12 36 36.7	10.798
4	1 20 54.03	1.9832	3 13 25.2	12.847	4	2 56 25.19	2.0124	12 47 22.7	10.734
5	1 22 53.01	1.9827	3 26 15.3	12.824	5	2 58 25.98	2.0139	12 58 4.8	10.670
6	1 24 51.96	1.9823	3 39 4.0	12.800	6	3 0 26.86	2.0154	13 8 43.1	10.605
7	1 26 50.89	1.9821	3 51 51.3	12.775	7	3 2 27.83	2.0169	13 19 17.4	10.538
8	1 28 49.81	1.9818	4 4 37.0	12.749	8	3 4 28.89	2.0185	13 29 47.7	10.471
9	1 30 48.71	1.9815	4 17 21.1	12.722	9	3 6 30.05	2.0201	13 40 14.0	10.404
10	1 32 47.59	1.9813	4 30 3.6	12.695	10	3 8 31.31	2.0217	13 50 36.2	10.336
11	1 34 46.47	1.9812	4 42 44.5	12.667	11	3 10 32.66	2.0233	14 0 54.3	10.267
12	1 36 45.34	1.9811	4 55 23.6	12.637	12	3 12 34.11	2.0250	14 11 8.2	10.197
13	1 38 44.20	1.9810	5 8 0.9	12.606	13	3 14 35.66	2.0267	14 21 17.9	10.126
14	1 40 43.06	1.9811	5 20 36.3	12.574	14	3 16 37.31	2.0284	14 31 23.3	10.054
15	1 42 41.93	1.9812	5 33 9.8	12.541	15	3 18 39.07	2.0301	14 41 24.4	9.982
16	1 44 40.80	1.9813	5 45 41.3	12.508	16	3 20 40.93	2.0318	14 51 21.2	9.910
17	1 46 39.68	1.9814	5 58 10.8	12.475	17	3 22 42.89	2.0335	15 1 13.6	9.836
18	1 48 38.57	1.9816	6 10 38.3	12.441	18	3 24 44.95	2.0353	15 11 1.5	9.761
19	1 50 37.47	1.9819	6 23 3.7	12.405	19	3 26 47.12	2.0371	15 20 44.9	9.686
20	1 52 36.39	1.9822	6 35 26.9	12.367	20	3 28 49.40	2.0389	15 30 23.8	9.611
21	1 54 35.33	1.9825	6 47 47.8	12.329	21	3 30 51.79	2.0407	15 39 58.2	9.535
22	1 56 34.29	1.9828	7 0 6.4	12.291	22	3 32 54.28	2.0424	15 49 28.0	9.457
23	1 58 33.27	1.9832	N. 7 12 22.7	12.251	23	3 34 56.88	2.0442	N.15 58 53.1	9.378
	WEDNESDAY 6.					**FRIDAY 8.**			
0	2 0 32.28	1.9837	N. 7 24 36.5	12.210	0	3 36 59.59	2.0461	N.16 8 13.4	9.299
1	2 2 31.32	1.9842	7 36 47.9	12.169	1	3 39 2.41	2.0479	16 17 29.0	9.220
2	2 4 30.39	1.9847	7 48 56.8	12.127	2	3 41 5.34	2.0498	16 26 39.8	9.141
3	2 6 29.49	1.9853	8 1 3.2	12.085	3	3 43 8.39	2.0517	16 35 45.9	9.061
4	2 8 28.63	1.9860	8 13 7.0	12.041	4	3 45 11.55	2.0536	16 44 47.1	8.979
5	2 10 27.81	1.9867	8 25 8.1	11.996	5	3 47 14.82	2.0554	16 53 43.4	8.896
6	2 12 27.04	1.9875	8 37 6.5	11.950	6	3 49 18.20	2.0573	17 2 34.7	8.813
7	2 14 26.31	1.9882	8 49 2.1	11.904	7	3 51 21.70	2.0592	17 11 21.0	8.730
8	2 16 25.63	1.9890	9 0 54.9	11.857	8	3 53 25.31	2.0611	17 20 2.3	8.647
9	2 18 24.99	1.9898	9 12 44.9	11.809	9	3 55 29.03	2.0630	17 28 38.6	8.562
10	2 20 24.41	1.9907	9 24 32.0	11.760	10	3 57 32.87	2.0649	17 37 9.8	8.477
11	2 22 23.88	1.9917	9 36 16.1	11.709	11	3 59 36.82	2.0668	17 45 35.8	8.390
12	2 24 23.41	1.9926	9 47 57.1	11.658	12	4 1 40.88	2.0687	17 53 56.6	8.303
13	2 26 22.99	1.9936	9 59 35.0	11.607	13	4 3 45.06	2.0706	18 2 12.2	8.216
14	2 28 22.64	1.9947	10 11 9.9	11.555	14	4 5 49.35	2.0724	18 10 22.6	8.129
15	2 30 22.35	1.9957	10 22 41.6	11.502	15	4 7 53.75	2.0743	18 18 27.7	8.041
16	2 32 22.12	1.9968	10 34 10.1	11.447	16	4 9 58.27	2.0763	18 26 27.5	7.952
17	2 34 21.96	1.9979	10 45 35.3	11.392	17	4 12 2.90	2.0782	18 34 21.9	7.862
18	2 36 21.87	1.9991	10 56 57.2	11.337	18	4 14 7.65	2.0801	18 42 10.9	7.772
19	2 38 21.85	2.0003	11 8 15.7	11.280	19	4 16 12.51	2.0819	18 49 54.5	7.681
20	2 40 21.90	2.0015	11 19 30.8	11.222	20	4 18 17.48	2.0837	18 57 32.6	7.589
21	2 42 22.03	2.0028	11 30 42.4	11.164	21	4 20 22.56	2.0856	19 5 5.2	7.497
22	2 44 22.24	2.0041	11 41 50.5	11.105	22	4 22 27.75	2.0875	19 12 32.3	7.405
23	2 46 22.53	2.0054	11 52 55.0	11.046	23	4 24 33.06	2.0894	19 19 53.8	7.312
24	2 48 22.89	2.0068	N.12 3 56.0	10.986	24	4 26 38.48	2.0912	N.19 27 9.7	7.218

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	SATURDAY 9.					**MONDAY 11.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	4 26 38.48	2.0912	N.19 27 9.7	7.218	0	6 8 44.85	2.1522	N.23 17 7.3	2.229
1	4 28 44.01	2.0930	19 34 20.0	7.124	1	6 10 53.99	2.1526	23 19 17.7	2.118
2	4 30 49.64	2.0948	19 41 24.6	7.029	2	6 13 3.16	2.1530	23 21 21.5	2.008
3	4 32 55.38	2.0966	19 48 23.5	6.934	3	6 15 12.35	2.1533	23 23 18.7	1.897
4	4 35 1.23	2.0984	19 55 16.7	6.838	4	6 17 21.56	2.1537	23 25 9.2	1.787
5	4 37 7.19	2.1002	20 2 4.1	6.742	5	6 19 30.79	2.1540	23 26 53.1	1.676
6	4 39 13.25	2.1019	20 8 45.7	6.645	6	6 21 40.04	2.1542	23 28 30.3	1.564
7	4 41 19.42	2.1037	20 15 21.5	6.547	7	6 23 49.30	2.1544	23 30 0.8	1.453
8	4 43 25.69	2.1054	20 21 51.4	6.450	8	6 25 58.57	2.1545	23 31 24.6	1.342
9	4 45 32.07	2.1071	20 28 15.5	6.352	9	6 28 7.84	2.1546	23 32 41.8	1.231
10	4 47 38.55	2.1088	20 34 33.7	6.253	10	6 30 17.12	2.1547	23 33 52.3	1.119
11	4 49 45.13	2.1104	20 40 45.9	6.153	11	6 32 26.40	2.1548	23 34 56.1	1.007
12	4 51 51.80	2.1121	20 46 52.1	6.053	12	6 34 35.69	2.1548	23 35 53.2	0.896
13	4 53 58.58	2.1137	20 52 52.3	5.953	13	6 36 44.97	2.1547	23 36 43.6	0.784
14	4 56 5.45	2.1153	20 58 46.5	5.853	14	6 38 54.25	2.1546	23 37 27.3	0.673
15	4 58 12.42	2.1169	21 4 34.7	5.752	15	6 41 3.52	2.1544	23 38 4.3	0.562
16	5 0 19.48	2.1184	21 10 16.8	5.651	16	6 43 12.78	2.1542	23 38 34.7	0.451
17	5 2 26.63	2.1200	21 15 52.8	5.549	17	6 45 22.03	2.1541	23 38 58.4	0.339
18	5 4 33.88	2.1216	21 21 22.6	5.446	18	6 47 31.27	2.1538	23 39 15.4	0.227
19	5 6 41.22	2.1230	21 26 46.3	5.343	19	6 49 40.49	2.1535	23 39 25.7	0.116
20	5 8 48.64	2.1244	21 32 3.8	5.240	20	6 51 49.69	2.1531	23 39 29.3	+ 0.004
21	5 10 56.15	2.1259	21 37 15.1	5.137	21	6 53 58.86	2.1527	23 39 26.2	− 0.107
22	5 13 3.75	2.1273	21 42 20.2	5.033	22	6 56 8.01	2.1522	23 39 16.5	0.218
23	5 15 11.43	2.1287	N.21 47 19.1	4.929	23	6 58 17.13	2.1518	N.23 39 0.1	0.329
	SUNDAY 10.					**TUESDAY 12.**			
0	5 17 19.19	2.1300	N.21 52 11.7	4.824	0	7 0 26.23	2.1513	N.23 38 37.0	0.440
1	5 19 27.03	2.1313	21 56 58.0	4.719	1	7 2 35.29	2.1507	23 38 7.3	0.551
2	5 21 34.95	2.1326	22 1 38.0	4.614	2	7 4 44.32	2.1502	23 37 30.9	0.662
3	5 23 42.95	2.1339	22 6 11.7	4.508	3	7 6 53.32	2.1496	23 36 47.8	0.773
4	5 25 51.02	2.1351	22 10 39.0	4.403	4	7 9 2.28	2.1489	23 35 58.1	0.884
5	5 27 59.16	2.1362	22 15 0.0	4.297	5	7 11 11.19	2.1482	23 35 1.7	0.995
6	5 30 7.37	2.1374	22 19 14.6	4.190	6	7 13 20.06	2.1474	23 33 58.7	1.105
7	5 32 15.65	2.1386	22 23 22.8	4.082	7	7 15 28.88	2.1467	23 32 49.1	1.215
8	5 34 24.00	2.1397	22 27 24.5	3.975	8	7 17 37.66	2.1459	23 31 32.9	1.325
9	5 36 32.42	2.1408	22 31 19.8	3.868	9	7 19 46.39	2.1451	23 30 10.1	1.435
10	5 38 40.90	2.1418	22 35 8.7	3.761	10	7 21 55.07	2.1442	23 28 40.7	1.545
11	5 40 49.43	2.1427	22 38 51.1	3.653	11	7 24 3.69	2.1432	23 27 4.7	1.654
12	5 42 58.02	2.1437	22 42 27.0	3.544	12	7 26 12.26	2.1423	23 25 22.2	1.763
13	5 45 6.67	2.1446	22 45 56.4	3.436	13	7 28 20.77	2.1413	23 23 33.1	1.872
14	5 47 15.37	2.1454	22 49 19.3	3.327	14	7 30 29.22	2.1402	23 21 37.5	1.982
15	5 49 24.12	2.1462	22 52 35.7	3.218	15	7 32 37.60	2.1392	23 19 35.3	2.091
16	5 51 32.92	2.1471	22 55 45.5	3.109	16	7 34 45.92	2.1381	23 17 26.6	2.199
17	5 53 41.77	2.1479	22 58 48.8	3.000	17	7 36 54.17	2.1369	23 15 11.4	2.308
18	5 55 50.67	2.1487	23 1 45.5	2.890	18	7 39 2.35	2.1357	23 12 49.6	2.417
19	5 57 59.61	2.1493	23 4 35.6	2.780	19	7 41 10.46	2.1346	23 10 21.3	2.525
20	6 0 8.59	2.1499	23 7 19.1	2.671	20	7 43 18.50	2.1334	23 7 46.6	2.632
21	6 2 17.60	2.1505	23 9 56.1	2.561	21	7 45 26.47	2.1322	23 5 5.5	2.739
22	6 4 26.65	2.1511	23 12 26.5	2.451	22	7 47 34.36	2.1309	23 2 17.9	2.847
23	6 6 35.73	2.1517	23 14 50.2	2.340	23	7 49 42.18	2.1297	22 59 23.9	2.954
24	6 8 44.85	2.1522	N.23 17 7.3	2.229	24	7 51 49.92	2.1283	N.22 56 23.4	3.061

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	WEDNESDAY 13.					**FRIDAY 15.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	7 51 49.92	2.1283	N.22 56 23.4	3.061	0	9 32 6.70	2.0473	N.18 32 47.3	7.772
1	7 53 57.58	2.1269	22 53 16.5	3.167	1	9 34 9.49	2.0456	18 24 58.3	7.860
2	7 56 5.15	2.1255	22 50 3.3	3.273	2	9 36 12.17	2.0439	18 17 4.1	7.948
3	7 58 12.64	2.1241	22 46 43.7	3.379	3	9 38 14.75	2.0422	18 9 4.6	8.035
4	8 0 20.04	2.1226	22 43 17.8	3.484	4	9 40 17.23	2.0406	18 0 59.9	8.121
5	8 2 27.35	2.1212	22 39 45.6	3.590	5	9 42 19.62	2.0390	17 52 50.1	8.207
6	8 4 34.58	2.1197	22 36 7.0	3.696	6	9 44 21.91	2.0373	17 44 35.1	8.292
7	8 6 41.72	2.1182	22 32 22.1	3.800	7	9 46 24.10	2.0357	17 36 15.0	8.377
8	8 8 48.77	2.1167	22 28 31.0	3.904	8	9 48 26.20	2.0342	17 27 49.8	8.462
9	8 10 55.72	2.1151	22 24 33.6	4.008	9	9 50 28.21	2.0327	17 19 19.6	8.545
10	8 13 2.58	2.1136	22 20 30.0	4.112	10	9 52 30.13	2.0312	17 10 44.4	8.628
11	8 15 9.35	2.1120	22 16 20.1	4.216	11	9 54 31.95	2.0296	17 2 4.2	8.711
12	8 17 16.02	2.1103	22 12 4.0	4.319	12	9 56 33.68	2.0281	16 53 19.0	8.794
13	8 19 22.59	2.1087	22 7 41.8	4.422	13	9 58 35.32	2.0267	16 44 28.9	8.876
14	8 21 29.06	2.1071	22 3 13.4	4.525	14	10 0 36.88	2.0252	16 35 33.9	8.957
15	8 23 35.44	2.1055	21 58 38.8	4.627	15	10 2 38.35	2.0238	16 26 34.0	9.038
16	8 25 41.72	2.1037	21 53 58.1	4.728	16	10 4 39.74	2.0225	16 17 29.3	9.118
17	8 27 47.89	2.1020	21 49 11.4	4.829	17	10 6 41.05	2.0212	16 8 19.8	9.198
18	8 29 53.96	2.1004	21 44 18.6	4.931	18	10 8 42.28	2.0198	15 59 5.5	9.277
19	8 31 59.98	2.0987	21 39 19.7	5.032	19	10 10 43.43	2.0185	15 49 46.5	9.356
20	8 34 5.80	2.0969	21 34 14.8	5.132	20	10 12 44.50	2.0173	15 40 22.8	9.435
21	8 36 11.56	2.0952	21 29 3.9	5.232	21	10 14 45.50	2.0161	15 30 54.3	9.513
22	8 38 17.22	2.0934	21 23 47.0	5.332	22	10 16 46.43	2.0148	15 21 21.2	9.590
23	8 40 22.77	2.0916	N.21 18 24.1	5.431	23	10 18 47.28	2.0136	N.15 11 43.5	9.667
	THURSDAY 14.					**SATURDAY 16.**			
0	8 42 28.21	2.0898	N.21 12 55.3	5.529	0	10 20 48.06	2.0125	N.15 2 1.2	9.743
1	8 44 33.55	2.0881	21 7 20.6	5.628	1	10 22 48.78	2.0114	14 52 14.4	9.818
2	8 46 38.78	2.0863	21 1 40.0	5.726	2	10 24 49.43	2.0103	14 42 23.1	9.893
3	8 48 43.90	2.0845	20 55 53.5	5.823	3	10 26 50.01	2.0092	14 32 27.2	9.968
4	8 50 48.92	2.0827	20 50 1.2	5.920	4	10 28 50.53	2.0082	14 22 26.9	10.042
5	8 52 53.83	2.0809	20 44 3.1	6.017	5	10 30 51.00	2.0073	14 12 22.2	10.115
6	8 54 58.63	2.0791	20 37 59.1	6.114	6	10 32 51.41	2.0063	14 2 13.1	10.187
7	8 57 3.32	2.0773	20 31 49.4	6.209	7	10 34 51.76	2.0054	13 51 59.7	10.259
8	8 59 7.91	2.0756	20 25 34.0	6.305	8	10 36 52.06	2.0046	13 41 42.0	10.331
9	9 1 12.39	2.0738	20 19 12.8	6.401	9	10 38 52.31	2.0038	13 31 20.0	10.402
10	9 3 16.76	2.0719	20 12 45.9	6.495	10	10 40 52.51	2.0030	13 20 53.7	10.473
11	9 5 21.02	2.0701	20 6 13.4	6.589	11	10 42 52.67	2.0022	13 10 23.2	10.543
12	9 7 25.17	2.0683	19 59 35.2	6.683	12	10 44 52.78	2.0015	12 59 48.5	10.613
13	9 9 29.21	2.0665	19 52 51.4	6.776	13	10 46 52.85	2.0008	12 49 9.7	10.681
14	9 11 33.15	2.0647	19 46 2.0	6.869	14	10 48 52.88	2.0002	12 38 26.8	10.748
15	9 13 36.98	2.0629	19 39 7.1	6.962	15	10 50 52.88	1.9997	12 27 39.9	10.816
16	9 15 40.70	2.0612	19 32 6.6	7.053	16	10 52 52.84	1.9991	12 16 48.9	10.883
17	9 17 44.32	2.0594	19 25 0.7	7.144	17	10 54 52.77	1.9987	12 5 53.9	10.950
18	9 19 47.83	2.0576	19 17 49.3	7.235	18	10 56 52.68	1.9982	11 54 54.9	11.016
19	9 21 51.28	2.0558	19 10 32.5	7.326	19	10 58 52.56	1.9978	11 43 52.0	11.081
20	9 23 54.53	2.0541	19 3 10.2	7.417	20	11 0 52.42	1.9974	11 32 45.2	11.145
21	9 25 57.73	2.0524	18 55 42.5	7.507	21	11 2 52.25	1.9971	11 21 34.6	11.209
22	9 28 0.82	2.0507	18 48 9.4	7.596	22	11 4 52.07	1.9969	11 10 20.1	11.272
23	9 30 3.81	2.0490	18 40 31.0	7.684	23	11 6 51.88	1.9967	10 59 1.9	11.335
24	9 32 6.70	2.0473	N.18 32 47.3	7.772	24	11 8 51.67	1.9964	N.10 47 39.9	11.397

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SUNDAY 17.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	11 8 51.67	1.9964	N.10 47 39.9	11.397
1	11 10 51.45	1.9963	10 36 14.2	11.458
2	11 12 51.23	1.9963	10 24 44.9	11.519
3	11 14 51.01	1.9963	10 13 11.9	11.579
4	11 16 50.79	1.9963	10 1 35.4	11.638
5	11 18 50.57	1.9963	9 49 55.3	11.697
6	11 20 50.35	1.9964	9 38 11.7	11.755
7	11 22 50.14	1.9967	9 26 24.7	11.813
8	11 24 49.95	1.9969	9 14 34.2	11.870
9	11 26 49.77	1.9972	9 2 40.3	11.926
10	11 28 49.61	1.9975	8 50 43.1	11.981
11	11 30 49.47	1.9979	8 38 42.6	12.036
12	11 32 49.36	1.9984	8 26 38.8	12.090
13	11 34 49.28	1.9989	8 14 31.8	12.143
14	11 36 49.23	1.9994	8 2 21.7	12.195
15	11 38 49.21	2.0000	7 50 8.4	12.247
16	11 40 49.23	2.0007	7 37 52.0	12.298
17	11 42 49.29	2.0014	7 25 32.6	12.348
18	11 44 49.40	2.0022	7 13 10.2	12.398
19	11 46 49.55	2.0030	7 0 44.8	12.447
20	11 48 49.76	2.0039	6 48 16.6	12.494
21	11 50 50.02	2.0048	6 35 45.5	12.541
22	11 52 50.34	2.0059	6 23 11.6	12.588
23	11 54 50.73	2.0070	N. 6 10 34.9	12.634

MONDAY 18.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	11 56 51.18	2.0081	N. 5 57 55.5	12.679
1	11 58 51.70	2.0092	5 45 13.4	12.723
2	12 0 52.29	2.0105	5 32 28.7	12.767
3	12 2 52.96	2.0118	5 19 41.4	12.809
4	12 4 53.71	2.0132	5 6 51.6	12.850
5	12 6 54.54	2.0146	4 53 59.4	12.891
6	12 8 55.46	2.0161	4 41 4.7	12.932
7	12 10 56.47	2.0177	4 28 7.6	12.971
8	12 12 57.58	2.0193	4 15 8.2	13.009
9	12 14 58.79	2.0210	4 2 6.5	13.047
10	12 17 0.10	2.0227	3 49 2.6	13.083
11	12 19 1.51	2.0244	3 35 56.6	13.118
12	12 21 3.03	2.0263	3 22 48.5	13.153
13	12 23 4.67	2.0283	3 9 38.3	13.187
14	12 25 6.43	2.0302	2 56 26.1	13.219
15	12 27 8.30	2.0322	2 43 12.0	13.251
16	12 29 10.30	2.0344	2 29 56.0	13.282
17	12 31 12.43	2.0366	2 16 38.1	13.313
18	12 33 14.69	2.0388	2 3 18.4	13.342
19	12 35 17.09	2.0411	1 49 57.0	13.370
20	12 37 19.63	2.0435	1 36 34.0	13.397
21	12 39 22.31	2.0459	1 23 9.4	13.423
22	12 41 25.14	2.0485	1 9 43.2	13.449
23	12 43 28.13	2.0512	0 56 15.5	13.472
24	12 45 31.28	2.0538	N. 0 42 46.5	13.495

TUESDAY 19.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	12 45 31.28	2.0538	N. 0 42 46.5	13.495
1	12 47 34.59	2.0565	0 29 16.1	13.517
2	12 49 38.06	2.0592	0 15 44.4	13.538
3	12 51 41.69	2.0620	N. 0 2 11.5	13.558
4	12 53 45.50	2.0650	S. 0 11 22.5	13.577
5	12 55 49.49	2.0679	0 24 57.7	13.595
6	12 57 53.65	2.0709	0 38 33.9	13.612
7	12 59 58.00	2.0741	0 52 11.1	13.628
8	13 2 2.54	2.0772	1 5 49.2	13.642
9	13 4 7.27	2.0804	1 19 28.1	13.654
10	13 6 12.19	2.0837	1 33 7.7	13.666
11	13 8 17.32	2.0871	1 46 48.0	13.677
12	13 10 22.65	2.0906	2 0 29.0	13.687
13	13 12 28.19	2.0942	2 14 10.5	13.696
14	13 14 33.94	2.0977	2 27 52.5	13.703
15	13 16 39.91	2.1013	2 41 34.9	13.709
16	13 18 46.10	2.1050	2 55 17.6	13.714
17	13 20 52.51	2.1088	3 9 0.6	13.717
18	13 22 59.15	2.1127	3 22 43.7	13.719
19	13 25 6.03	2.1166	3 36 26.9	13.721
20	13 27 13.14	2.1205	3 50 10.2	13.722
21	13 29 20.49	2.1246	4 3 53.5	13.720
22	13 31 28.09	2.1287	4 17 36.6	13.717
23	13 33 35.93	2.1328	S. 4 31 19.5	13.712

WEDNESDAY 20.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	13 35 44.02	2.1370	S. 4 45 2.1	13.707
1	13 37 52.37	2.1413	4 58 44.3	13.700
2	13 40 0.98	2.1457	5 12 26.1	13.692
3	13 42 9.85	2.1501	5 26 7.4	13.682
4	13 44 18.99	2.1546	5 39 48.0	13.671
5	13 46 28.40	2.1592	5 53 27.9	13.659
6	13 48 38.09	2.1638	6 7 7.1	13.646
7	13 50 48.05	2.1684	6 20 45.4	13.630
8	13 52 58.30	2.1732	6 34 22.7	13.613
9	13 55 8.83	2.1779	6 47 59.0	13.596
10	13 57 19.65	2.1827	7 1 34.2	13.576
11	13 59 30.76	2.1877	7 15 8.1	13.553
12	14 1 42.17	2.1927	7 28 40.6	13.530
13	14 3 53.88	2.1977	7 42 11.7	13.507
14	14 6 5.89	2.2028	7 55 41.4	13.482
15	14 8 18.21	2.2079	8 9 9.5	13.454
16	14 10 30.84	2.2132	8 22 35.9	13.425
17	14 12 43.79	2.2184	8 36 0.5	13.395
18	14 14 57.05	2.2237	8 49 23.3	13.363
19	14 17 10.63	2.2291	9 2 44.1	13.329
20	14 19 24.54	2.2345	9 16 2.8	13.294
21	14 21 38.77	2.2399	9 29 19.4	13.257
22	14 23 53.33	2.2455	9 42 33.7	13.218
23	14 26 8.23	2.2511	9 55 45.6	13.178
24	14 28 23.46	2.2567	S.10 8 55.1	13.137

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	THURSDAY 21.					**SATURDAY 23.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	14 28 23.46	2.2567	S. 10 8 55.1	13.137	0	16 23 44.68	2.5514	S. 19 17 42.1	9.031
1	14 30 39.03	2.2623	10 22 2.0	13.093	1	16 26 17.94	2.5572	19 26 40.1	8.902
2	14 32 54.94	2.2680	10 35 6.3	13.048	2	16 28 51.55	2.5630	19 35 30.3	8.771
3	14 35 11.19	2.2737	10 48 7.8	13.001	3	16 31 25.50	2.5686	19 44 12.6	8.638
4	14 37 27.79	2.2796	11 1 6.4	12.952	4	16 33 59.78	2.5741	19 52 46.8	8.503
5	14 39 44.74	2.2855	11 14 2.1	12.902	5	16 36 34.39	2.5796	20 1 12.9	8.367
6	14 42 2.05	2.2914	11 26 54.7	12.850	6	16 39 9.33	2.5850	20 9 30.8	8.229
7	14 44 19.71	2.2973	11 39 44.1	12.796	7	16 41 44.59	2.5903	20 17 40.4	8.090
8	14 46 37.73	2.3032	11 52 30.2	12.741	8	16 44 20.17	2.5956	20 25 41.6	7.948
9	14 48 56.10	2.3092	12 5 13.0	12.684	9	16 46 56.06	2.6007	20 33 34.2	7.805
10	14 51 14.83	2.3153	12 17 52.3	12.625	10	16 49 32.26	2.6058	20 41 18.2	7.662
11	14 53 33.93	2.3214	12 30 28.0	12.564	11	16 52 8.76	2.6108	20 48 53.6	7.517
12	14 55 53.40	2.3275	12 43 0.0	12.502	12	16 54 45.56	2.6157	20 56 20.2	7.369
13	14 58 13.23	2.3336	12 55 28.2	12.437	13	16 57 22.65	2.6206	21 3 37.9	7.221
14	15 0 33.43	2.3398	13 7 52.5	12.371	14	17 0 0.03	2.6252	21 10 46.7	7.072
15	15 2 54.00	2.3460	13 20 12.7	12.302	15	17 2 37.68	2.6298	21 17 46.5	6.921
16	15 5 14.95	2.3522	13 32 28.8	12.232	16	17 5 15.61	2.6344	21 24 37.2	6.768
17	15 7 36.27	2.3584	13 44 40.6	12.161	17	17 7 53.81	2.6388	21 31 18.7	6.614
18	15 9 57.96	2.3647	13 56 48.1	12.087	18	17 10 32.27	2.6431	21 37 50.9	6.458
19	15 12 20.03	2.3710	14 8 51.1	12.012	19	17 13 10.98	2.6472	21 44 13.7	6.302
20	15 14 42.48	2.3773	14 20 49.6	11.936	20	17 15 49.94	2.6513	21 50 27.2	6.146
21	15 17 5.31	2.3837	14 32 43.4	11.857	21	17 18 29.14	2.6552	21 56 31.2	5.987
22	15 19 28.52	2.3900	14 44 32.4	11.776	22	17 21 8.57	2.6591	22 2 25.6	5.827
23	15 21 52.11	2.3963	S. 14 56 16.5	11.692	23	17 23 48.23	2.6628	S. 22 8 10.4	5.666
	FRIDAY 22.					**SUNDAY 24.**			
0	15 24 16.07	2.4026	S. 15 7 55.5	11.607	0	17 26 28.10	2.6663	S. 22 13 45.5	5.503
1	15 26 40.42	2.4090	15 19 29.4	11.522	1	17 29 8.18	2.6698	22 19 10.8	5.340
2	15 29 5.15	2.4153	15 30 58.1	11.434	2	17 31 48.47	2.6732	22 24 26.3	5.177
3	15 31 30.26	2.4217	15 42 21.5	11.344	3	17 34 28.96	2.6763	22 29 32.0	5.012
4	15 33 55.76	2.4281	15 53 39.4	11.252	4	17 37 9.63	2.6793	22 34 27.7	4.845
5	15 36 21.64	2.4345	16 4 51.8	11.159	5	17 39 50.48	2.6822	22 39 13.4	4.677
6	15 38 47.90	2.4408	16 15 58.5	11.063	6	17 42 31.50	2.6850	22 43 49.0	4.509
7	15 41 14.54	2.4472	16 26 59.4	10.966	7	17 45 12.68	2.6876	22 48 14.5	4.341
8	15 43 41.56	2.4535	16 37 54.4	10.866	8	17 47 54.01	2.6900	22 52 29.9	4.172
9	15 46 8.96	2.4598	16 48 43.3	10.764	9	17 50 35.48	2.6923	22 56 35.2	4.002
10	15 48 36.74	2.4662	16 59 26.1	10.662	10	17 53 17.09	2.6946	23 0 30.2	3.831
11	15 51 4.90	2.4725	17 10 2.8	10.558	11	17 55 58.83	2.6967	23 4 14.9	3.659
12	15 53 33.44	2.4788	17 20 33.1	10.451	12	17 58 40.69	2.6986	23 7 49.3	3.487
13	15 56 2.36	2.4851	17 30 56.9	10.342	13	18 1 22.66	2.7003	23 11 13.3	3.314
14	15 58 31.65	2.4913	17 41 14.2	10.232	14	18 4 4.72	2.7018	23 14 26.9	3.140
15	16 1 1.31	2.4974	17 51 24.8	10.120	15	18 6 46.87	2.7032	23 17 30.1	2.966
16	16 3 31.34	2.5036	18 1 28.6	10.006	16	18 9 29.10	2.7045	23 20 22.8	2.792
17	16 6 1.74	2.5097	18 11 25.5	9.890	17	18 12 11.41	2.7057	23 23 5.1	2.618
18	16 8 32.51	2.5158	18 21 15.4	9.772	18	18 14 53.78	2.7066	23 25 36.9	2.443
19	16 11 3.64	2.5218	18 30 58.2	9.653	19	18 17 36.20	2.7073	23 27 58.2	2.267
20	16 13 35.13	2.5279	18 40 33.8	9.532	20	18 20 18.66	2.7079	23 30 8.9	2.090
21	16 16 6.99	2.5340	18 50 2.1	9.410	21	18 23 1.15	2.7084	23 32 9.0	1.913
22	16 18 39.21	2.5398	18 59 23.0	9.286	22	18 25 43.67	2.7087	23 33 58.5	1.737
23	16 21 11.77	2.5456	19 8 36.4	9.159	23	18 28 26.20	2.7089	23 35 37.5	1.561
24	16 23 44.68	2.5514	S. 19 17 42.1	9.031	24	18 31 8.74	2.7089	S. 23 37 5.9	1.385

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

MONDAY 25.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	18 31 8.74	2.7089	S.23 37 5.9	1.385
1	18 33 51.27	2.7087	23 38 23.7	1.208
2	18 36 33.79	2.7084	23 39 30.9	1.031
3	18 39 16.28	2.7079	23 40 27.4	0.854
4	18 41 58.74	2.7073	23 41 13.4	0.678
5	18 44 41.16	2.7065	23 41 48.8	0.502
6	18 47 23.52	2.7055	23 42 13.6	0.325
7	18 50 5.82	2.7044	23 42 27.8	− 0.149
8	18 52 48.05	2.7031	23 42 31.5	+ 0.027
9	18 55 30.19	2.7016	23 42 24.6	0.202
10	18 58 12.24	2.7000	23 42 7.2	0.377
11	19 0 54.19	2.6982	23 41 39.3	0.553
12	19 8 36.03	2.6963	23 41 0.8	0.728
13	19 6 17.75	2.6943	23 40 11.9	0.902
14	19 8 59.34	2.6921	23 39 12.6	1.076
15	19 11 40.80	2.6897	23 38 2.8	1.250
16	19 14 22.11	2.6872	23 36 42.6	1.422
17	19 17 3.26	2.6844	23 35 12.1	1.594
18	19 19 44.24	2.6816	23 33 31.3	1.766
19	19 22 25.05	2.6787	23 31 40.2	1.937
20	19 25 5.68	2.6756	23 29 38.9	2.106
21	19 27 46.12	2.6723	23 27 27.5	2.275
22	19 30 26.36	2.6690	23 25 5.9	2.444
23	19 33 6.40	2.6655	S.23 22 34.2	2.612

TUESDAY 26.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	19 35 46.22	2.6618	S.23 19 52.5	2.778
1	19 38 25.82	2.6581	23 17 0.8	2.944
2	19 41 5.19	2.6542	23 13 59.2	3.110
3	19 43 44.32	2.6501	23 10 47.6	3.275
4	19 46 23.20	2.6458	23 7 26.2	3.438
5	19 49 1.82	2.6415	23 3 55.0	3.600
6	19 51 40.18	2.6371	23 0 14.2	3.761
7	19 54 18.27	2.6327	22 56 23.7	3.922
8	19 56 56.10	2.6282	22 52 23.6	4.081
9	19 59 33.65	2.6234	22 48 14.0	4.238
10	20 2 10.91	2.6185	22 43 55.0	4.395
11	20 4 47.87	2.6135	22 39 26.6	4.551
12	20 7 24.53	2.6085	22 34 48.9	4.705
13	20 10 0.89	2.6033	22 30 2.0	4.858
14	20 12 36.93	2.5980	22 25 5.9	5.011
15	20 15 12.65	2.5927	22 20 0.7	5.163
16	20 17 48.05	2.5873	22 14 46.4	5.312
17	20 20 23.13	2.5818	22 9 23.3	5.459
18	20 22 57.87	2.5762	22 3 51.4	5.605
19	20 25 32.27	2.5705	21 58 10.7	5.751
20	20 28 6.33	2.5647	21 52 21.2	5.896
21	20 30 40.04	2.5589	21 46 23.1	6.039
22	20 33 13.40	2.5530	21 40 16.5	6.180
23	20 35 46.40	2.5470	21 34 1.5	6.320
24	20 38 19.04	2.5410	S.21 27 38.1	6.459

WEDNESDAY 27.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	20 38 19.04	2.5410	S.21 27 38.1	6.459
1	20 40 51.32	2.5349	21 21 6.4	6.597
2	20 43 23.28	2.5287	21 14 26.5	6.733
3	20 45 54.77	2.5225	21 7 38.6	6.865
4	20 48 25.93	2.5163	21 0 42.7	6.998
5	20 50 56.72	2.5100	20 53 38.8	7.131
6	20 53 27.13	2.5037	20 46 27.0	7.261
7	20 55 57.16	2.4973	20 39 7.5	7.388
8	20 58 26.80	2.4908	20 31 40.4	7.515
9	21 0 56.05	2.4843	20 24 5.7	7.641
10	21 3 24.92	2.4778	20 16 23.5	7.764
11	21 5 53.39	2.4712	20 8 34.0	7.886
12	21 8 21.47	2.4647	20 0 37.2	8.007
13	21 10 49.15	2.4581	19 52 33.2	8.127
14	21 13 16.44	2.4515	19 44 22.0	8.244
15	21 15 43.33	2.4448	19 36 3.9	8.359
16	21 18 9.82	2.4382	19 27 38.9	8.474
17	21 20 35.91	2.4315	19 19 7.0	8.587
18	21 23 1.60	2.4248	19 10 28.4	8.698
19	21 25 26.89	2.4181	19 1 43.2	8.808
20	21 27 51.78	2.4114	18 52 51.4	8.917
21	21 30 16.26	2.4047	18 43 53.1	9.024
22	21 32 40.34	2.3980	18 34 48.5	9.129
23	21 35 4.02	2.3913	S.18 25 37.6	9.232

THURSDAY 28.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	21 37 27.30	2.3847	S.18 16 20.6	9.334
1	21 39 50.18	2.3780	18 6 57.5	9.435
2	21 42 12.66	2.3712	17 57 28.4	9.534
3	21 44 34.73	2.3645	17 47 53.4	9.632
4	21 46 56.40	2.3579	17 38 12.6	9.728
5	21 49 17.68	2.3513	17 28 26.0	9.822
6	21 51 38.56	2.3447	17 18 33.9	9.914
7	21 53 59.04	2.3381	17 8 36.3	10.006
8	21 56 19.13	2.3315	16 58 33.2	10.096
9	21 58 38.82	2.3249	16 48 24.8	10.183
10	22 0 58.12	2.3184	16 38 11.2	10.270
11	22 3 17.03	2.3119	16 27 52.4	10.356
12	22 5 35.55	2.3054	16 17 28.5	10.439
13	22 7 53.68	2.2989	16 6 59.7	10.521
14	22 10 11.42	2.2925	15 56 26.0	10.602
15	22 12 28.78	2.2862	15 45 47.5	10.681
16	22 14 45.76	2.2798	15 35 4.3	10.758
17	22 17 2.36	2.2735	15 24 16.5	10.835
18	22 19 18.58	2.2672	15 13 24.1	10.911
19	22 21 34.43	2.2610	15 2 27.2	10.983
20	22 23 49.90	2.2548	14 51 26.1	11.053
21	22 26 5.00	2.2487	14 40 20.8	11.123
22	22 28 19.74	2.2426	14 29 11.3	11.193
23	22 30 34.11	2.2365	14 17 57.6	11.262
24	22 32 48.12	2.2305	S.14 6 39.9	11.328

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

FRIDAY 29.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	22 32 48.12	2.2305	S. 14 6 39.9	11.328
1	22 35 1.77	2.2246	13 55 18.3	11.392
2	22 37 15.07	2.2187	13 43 52.9	11.455
3	22 39 28.01	2.2128	13 32 23.7	11.517
4	22 41 40.60	2.2070	13 20 50.8	11.577
5	22 43 52.85	2.2012	13 9 14.4	11.636
6	22 46 4.75	2.1955	12 57 34.5	11.694
7	22 48 16.31	2.1898	12 45 51.1	11.751
8	22 50 27.53	2.1842	12 34 4.4	11.805
9	22 52 38.42	2.1787	12 22 14.5	11.858
10	22 54 48.98	2.1733	12 10 21.4	11.911
11	22 56 59.22	2.1679	11 58 25.1	11.963
12	22 59 9.13	2.1625	11 46 25.8	12.013
13	23 1 18.72	2.1572	11 34 23.6	12.061
14	23 3 28.00	2.1520	11 22 18.5	12.107
15	23 5 36.96	2.1468	11 10 10.7	12.152
16	23 7 45.62	2.1417	10 58 0.2	12.197
17	23 9 53.97	2.1367	10 45 47.0	12.242
18	23 12 2.02	2.1317	10 33 31.1	12.285
19	23 14 9.77	2.1268	10 21 12.8	12.325
20	23 16 17.23	2.1219	10 8 52.1	12.364
21	23 18 24.40	2.1172	9 56 29.1	12.402
22	23 20 31.29	2.1125	9 44 3.8	12.440
23	23 22 37.90	2.1078	S. 9 31 36.3	12.476

SATURDAY 30.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	23 24 44.23	2.1032	S. 9 19 6.7	12.511
1	23 26 50.28	2.0987	9 6 35.0	12.544
2	23 28 56.07	2.0942	8 54 1.4	12.576
3	23 31 1.59	2.0898	8 41 25.9	12.607
4	23 33 6.85	2.0855	8 28 48.5	12.638
5	23 35 11.85	2.0812	8 16 9.3	12.666
6	23 37 16.60	2.0771	8 3 28.5	12.693
7	23 39 21.10	2.0730	7 50 46.1	12.720
8	23 41 25.36	2.0690	7 38 2.1	12.747
9	23 43 29.38	2.0650	7 25 16.5	12.772
10	23 45 33.16	2.0610	7 12 29.5	12.794
11	23 47 36.70	2.0571	6 59 41.2	12.816
12	23 49 40.01	2.0533	6 46 51.6	12.837
13	23 51 43.10	2.0497	6 34 0.7	12.857
14	23 53 45.98	2.0462	6 21 8.7	12.876
15	23 55 48.64	2.0426	6 8 15.6	12.894
16	23 57 51.09	2.0391	5 55 21.4	12.911
17	23 59 53.33	2.0357	5 42 26.3	12.926
18	0 1 55.37	2.0323	5 29 30.3	12.940
19	0 3 57.21	2.0290	5 16 33.5	12.954
20	0 5 58.85	2.0258	5 3 35.8	12.967
21	0 8 0.30	2.0227	4 50 37.4	12.978
22	0 10 1.57	2.0197	4 37 38.4	12.989
23	0 12 2.66	2.0167	4 24 38.7	12.999
24	0 14 3.57	2.0138	S. 4 11 38.5	13.007

SUNDAY, DECEMBER 1.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	0 14 3.57	2.0138	S. 4 11 38.5	13.007

PHASES OF THE MOON.

		d	h	m
○ Full Moon	Nov.	7	4	5.2
☾ Last Quarter		15	8	35.9
● New Moon		22	13	43.6
☽ First Quarter		29	5	28.7

		d	h
☾ Apogee	Nov.	12	4.4
☾ Perigee		24	3.5

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Sun	W.	104° 43′ 49″	2754	106° 19′ 17″	2763	107° 54′ 34″	2772	109° 29′ 39″	2780
	Antares	W.	75 35 35	2445	77 18 5	2453	79 0 24	2461	80 42 32	2469
	Jupiter	W.	49 7 31	2469	50 49 28	2477	52 31 14	2485	54 12 48	2493
	α Arietis	E.	73 6 0	2565	71 26 17	2576	69 46 49	2587	68 7 36	2599
	Aldebaran	E.	103 43 19	2420	102 0 13	2428	100 17 18	2436	98 34 35	2444
2	Sun	W.	117 22 10	2825	118 56 5	2835	120 29 48	2843	122 3 20	2852
	Antares	W.	89 10 28	2508	90 51 30	2517	92 32 20	2525	94 12 59	2533
	Jupiter	W.	62 37 47	2534	64 18 13	2543	65 58 27	2551	67 38 30	2559
	α Aquilæ	W.	49 25 46	3825	50 40 22	3767	51 55 59	3716	53 12 29	3672
	α Arietis	E.	59 55 47	2666	58 18 21	2681	56 41 15	2696	55 4 30	2713
	Aldebaran	E.	90 3 48	2484	88 22 12	2492	86 40 48	2500	84 59 35	2509
3	Jupiter	W.	75 55 52	2601	77 34 46	2609	79 13 29	2617	80 52 1	2625
	α Aquilæ	W.	59 45 28	3508	61 5 43	3486	62 26 23	3465	63 47 26	3448
	α Arietis	E.	47 6 41	2811	45 32 28	2835	43 58 46	2861	42 25 37	2889
	Aldebaran	E.	76 36 22	2549	74 56 17	2558	73 16 24	2566	71 36 42	2574
4	Jupiter	W.	89 1 52	2667	90 39 16	2675	92 16 29	2684	93 53 30	2692
	α Aquilæ	W.	70 36 47	3391	71 59 14	3385	73 21 48	3380	74 44 27	3377
	Fomalhaut	W.	35 9 57	3210	36 35 54	3174	38 2 34	3143	39 29 52	3116
	Aldebaran	E.	63 21 2	2616	61 42 29	2624	60 4 7	2633	58 25 57	2642
5	Jupiter	W.	101 55 46	2735	103 31 39	2744	105 7 20	2753	106 42 50	2762
	α Aquilæ	W.	81 38 12	3379	83 0 53	3382	84 23 30	3386	85 46 2	3393
	Fomalhaut	W.	46 52 59	3034	48 22 30	3024	49 52 13	3017	51 22 5	3011
	Aldebaran	E.	50 18 5	2686	48 41 6	2695	47 4 20	2704	45 27 46	2713
	Pollux	E.	94 30 11	2692	92 53 20	2700	91 16 40	2709	89 40 12	2717
6	α Aquilæ	W.	92 36 39	3437	93 58 14	3447	95 19 37	3460	96 40 46	3474
	Fomalhaut	W.	58 52 39	3001	60 22 51	3001	61 53 3	3002	63 23 13	3005
	α Pegasi	W.	44 59 9	3626	46 17 15	3589	47 36 1	3556	48 55 23	3527
	Aldebaran	E.	37 28 6	2763	35 52 49	2773	34 17 46	2784	32 42 57	2795
	Pollux	E.	81 40 43	2761	80 5 24	2770	78 30 17	2779	76 55 22	2788
7	Fomalhaut	W.	70 53 6	3024	72 22 49	3029	73 52 26	3034	75 21 56	3041
	α Pegasi	W.	55 39 0	3430	57 0 43	3416	58 22 41	3406	59 44 51	3397
	Pollux	E.	69 3 43	2834	67 29 59	2843	65 56 27	2852	64 23 7	2862
	Regulus	E.	104 57 17	2824	103 23 20	2832	101 49 34	2842	100 16 0	2850
8	Fomalhaut	W.	82 47 28	3074	84 16 9	3082	85 44 41	3090	87 13 3	3097
	α Pegasi	W.	66 37 44	3371	68 0 34	3369	69 23 26	3369	70 46 18	3369
	Pollux	E.	56 39 30	2909	55 7 23	2919	53 35 28	2928	52 3 45	2938
	Regulus	E.	92 30 56	2894	90 58 29	2902	89 26 13	2910	87 54 7	2919
	Saturn	E.	97 0 50	2912	95 28 47	2921	93 56 55	2930	92 25 14	2938
9	Fomalhaut	W.	94 32 27	3139	95 59 49	3148	97 27 0	3157	98 54 1	3166
	α Pegasi	W.	77 40 28	3377	79 3 11	3381	80 25 49	3385	81 48 23	3389
	α Arietis	W.	34 2 56	3402	35 25 10	3378	36 47 52	3357	38 10 58	3338
	Pollux	E.	44 28 12	2986	42 57 42	2996	41 27 24	3005	39 57 18	3016
	Regulus	E.	80 16 17	2960	78 45 14	2968	77 14 21	2975	75 43 37	2983
	Saturn	E.	84 49 24	2979	83 18 45	2986	81 48 15	2993	80 17 54	3001

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	**Sun**	W.	111° 4′ 33″	2789	112° 39′ 15″	2798	114° 13′ 45″	2806	115° 48′ 3″	2816
	Antares	W.	82 24 29	2476	84 6 16	2485	85 47 51	2492	87 29 15	2500
	Jupiter	W.	55 54 11	2502	57 35 22	2510	59 16 22	2518	60 57 10	2526
	α Arietis	E.	66 28 39	2611	64 49 59	2624	63 11 37	2636	61 33 33	2651
	Aldebaran	E.	96 52 3	2452	95 9 42	2460	93 27 33	2468	91 45 35	2476
2	**Sun**	W.	123 36 40	2862	125 9 48	2871	126 42 44	2880	128 15 28	2889
	Antares	W.	95 53 27	2541	97 33 43	2549	99 13 48	2558	100 53 41	2566
	Jupiter	W.	69 18 21	2567	70 58 1	2576	72 37 29	2584	74 16 46	2592
	α Aquilæ	W.	54 29 46	3632	55 47 46	3595	57 6 26	3563	58 25 41	3534
	α Arietis	E.	53 28 7	2730	51 52 7	2749	50 16 32	2769	48 41 23	2789
	Aldebaran	E.	83 18 34	2517	81 37 44	2525	79 57 5	2533	78 16 38	2541
3	**Jupiter**	W.	82 30 22	2633	84 8 32	2642	85 46 30	2650	87 24 17	2659
	α Aquilæ	W.	65 8 48	3432	66 30 28	3420	67 52 22	3409	69 14 29	3399
	α Arietis	E.	40 53 4	2920	39 21 10	2953	37 49 58	2990	36 19 33	3030
	Aldebaran	E.	69 57 11	2583	68 17 52	2591	66 38 44	2599	64 59 47	2607
4	**Jupiter**	W.	95 30 20	2701	97 6 59	2710	98 43 26	2718	100 19 42	2727
	α Aquilæ	W.	76 7 10	3374	77 29 56	3374	78 52 42	3374	80 15 28	3376
	Fomalhaut	W.	40 57 42	3093	42 26 0	3074	43 54 41	3058	45 23 42	3045
	Aldebaran	E.	56 47 59	2651	55 10 13	2660	53 32 39	2668	51 55 16	2677
5	**Jupiter**	W.	108 18 8	2770	109 53 15	2779	111 28 10	2788	113 2 53	2797
	α Aquilæ	W.	87 8 27	3400	88 30 44	3407	89 52 53	3415	91 14 52	3426
	Fomalhaut	W.	52 52 4	3007	54 22 8	3004	55 52 16	3001	57 22 27	3001
	Aldebaran	E.	43 51 24	2723	42 15 15	2733	40 39 19	2743	39 3 36	2753
	Pollux	E.	88 3 55	2726	86 27 50	2735	84 51 56	2744	83 16 14	2752
6	α Aquilæ	W.	98 1 39	3488	99 22 16	3504	100 42 36	3520	102 2 38	3537
	Fomalhaut	W.	64 53 20	3007	66 23 24	3011	67 53 23	3015	69 23 17	3019
	α Pegasi	W.	50 15 17	3502	51 35 39	3480	52 56 25	3461	54 17 33	3444
	Aldebaran	E.	31 8 22	2806	29 34 2	2818	27 59 57	2829	26 26 7	2842
	Pollux	E.	75 20 38	2798	73 46 7	2806	72 11 47	2815	70 37 39	2825
7	Fomalhaut	W.	76 51 18	3047	78 20 33	3053	79 49 40	3060	81 18 38	3067
	α Pegasi	W.	61 7 11	3389	62 29 40	3383	63 52 16	3378	65 14 58	3374
	Pollux	E.	62 50 0	2872	61 17 5	2880	59 44 21	2890	58 11 49	2900
	Regulus	E.	98 42 37	2859	97 9 25	2867	95 36 24	2876	94 3 34	2885
8	Fomalhaut	W.	88 41 16	3105	90 9 19	3114	91 37 12	3122	93 4 55	3131
	α Pegasi	W.	72 9 10	3369	73 32 2	3370	74 54 53	3372	76 17 42	3374
	Pollux	E.	50 32 14	2947	49 0 55	2957	47 29 48	2967	45 58 54	2977
	Regulus	E.	86 22 12	2927	84 50 28	2935	83 18 54	2943	81 47 30	2952
	Saturn	E.	90 53 43	2946	89 22 23	2954	87 51 13	2962	86 20 13	2971
9	Fomalhaut	W.	100 20 51	3175	101 47 30	3184	103 13 58	3193	104 40 15	3204
	α Pegasi	W.	83 10 52	3393	84 33 16	3399	85 55 34	3404	87 17 46	3410
	α Arietis	W.	39 34 25	3324	40 58 9	3310	42 22 9	3299	43 46 22	3289
	Pollux	E.	38 27 25	3026	36 57 44	3036	35 28 16	3047	33 59 2	3059
	Regulus	E.	74 13 3	2990	72 42 38	2998	71 12 23	3005	69 42 16	3012
	Saturn	E.	78 47 42	3009	77 17 40	3016	75 47 47	3023	74 18 3	3030

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
10	Fomalhaut	W.	106° 6′ 20″	3213	107° 32′ 14″	3222	108° 57′ 57″	3230	110° 23′ 28″	3242
	α Arietis	W.	45 10 46	3281	46 35 20	3275	48 0 1	3269	49 24 49	3264
	Regulus	E.	68 12 18	3019	66 42 29	3026	65 12 48	3031	63 43 14	3037
	Saturn	E.	72 48 27	3036	71 18 59	3043	69 49 39	3048	68 20 26	3055
	Mars	E.	99 39 13	3242	98 13 54	3249	96 48 43	3255	95 23 39	3261
11	α Arietis	W.	56 30 3	3247	57 55 16	3245	59 20 32	3243	60 45 50	3242
	Aldebaran	W.	24 18 39	3090	25 47 1	3090	27 15 23	3091	28 43 44	3091
	Regulus	E.	56 17 11	3065	54 48 18	3069	53 19 31	3074	51 50 50	3078
	Saturn	E.	60 56 8	3080	59 27 34	3084	57 59 5	3089	56 30 42	3093
	Mars	E.	88 20 0	3288	86 55 34	3292	85 31 13	3296	84 6 57	3300
	Sun	E.	137 18 46	3455	135 57 32	3458	134 36 21	3462	133 15 14	3464
12	α Arietis	W.	67 52 48	3234	69 18 17	3231	70 43 49	3230	72 9 23	3228
	Aldebaran	W.	36 5 18	3094	37 33 35	3094	39 1 52	3094	40 30 9	3093
	Regulus	E.	44 28 29	3094	43 0 12	3097	41 31 59	3099	40 3 48	3101
	Saturn	E	49 9 48	3106	47 41 46	3109	46 13 47	3110	44 45 50	3111
	Mars	E.	77 6 33	3313	75 42 36	3314	74 18 41	3316	72 54 48	3317
	Venus	E.	103 2 6	3565	101 42 54	3567	100 23 44	3568	99 4 35	3568
	Sun	E.	126 30 23	3475	125 9 31	3476	123 48 40	3477	122 27 50	3477
13	Aldebaran	W.	47 51 51	3087	49 20 17	3083	50 48 47	3081	52 17 20	3078
	Regulus	E.	32 43 24	3107	31 15 23	3109	29 47 24	3110	28 19 26	3111
	Saturn	E.	37 26 15	3112	35 58 20	3111	34 30 24	3110	33 2 27	3109
	Mars	E.	65 55 25	3313	64 31 29	3312	63 7 31	3310	61 43 31	3306
	Spica	E.	86 46 25	3106	85 18 23	3105	83 50 19	3102	82 22 12	3100
	Venus	E.	92 28 49	3565	91 9 37	3563	89 50 22	3559	88 31 3	3555
	Sun	E.	115 43 31	3471	114 22 34	3469	113 1 35	3466	111 40 33	3463
14	Aldebaran	W.	59 41 18	3055	61 10 23	3048	62 39 36	3042	64 8 57	3035
	Mars	E.	54 42 29	3286	53 18 1	3281	51 53 27	3275	50 28 46	3269
	Spica	E.	75 0 38	3080	73 32 4	3075	72 3 24	3069	70 34 37	3063
	Venus	E.	81 53 25	3533	80 33 37	3526	79 13 42	3520	77 53 40	3512
	Sun	E.	104 54 12	3438	103 32 38	3431	102 10 57	3424	100 49 8	3418
15	Aldebaran	W.	71 37 59	2994	73 8 19	2984	74 38 52	2974	76 9 37	2964
	Pollux	W.	27 43 28	3062	29 12 24	3046	30 41 40	3030	32 11 15	3014
	Mars	E.	43 23 20	3231	41 57 47	3221	40 32 3	3213	39 6 9	3203
	Spica	E.	63 8 41	3028	61 39 3	3019	60 9 14	3011	58 39 15	3001
	Venus	E.	71 11 12	3468	69 50 12	3457	68 29 0	3446	67 7 35	3435
	Sun	E.	93 57 49	3372	92 35 1	3363	91 12 2	3351	89 48 50	3340
16	Aldebaran	W.	83 46 49	2905	85 19 1	2892	86 51 30	2879	88 24 16	2865
	Pollux	W.	39 43 58	2939	41 15 28	2924	42 47 17	2908	44 19 26	2892
	Mars	E.	31 53 42	3152	30 26 35	3142	28 59 16	3132	27 31 45	3122
	Spica	E.	51 6 22	2953	49 35 10	2942	48 3 45	2932	46 32 7	2922
	Venus	E.	60 17 9	3371	58 54 19	3357	57 31 13	3349	56 7 50	3336
	Sun	E.	82 49 23	3276	81 24 44	3262	79 59 48	3247	78 34 35	3233
17	Pollux	W.	52 5 18	2811	53 39 32	2794	55 14 8	2776	56 49 7	2760
	Spica	E.	38 50 36	2870	37 17 39	2860	35 44 29	2852	34 11 8	2844
	Venus	E.	49 6 23	3246	47 41 8	3229	46 15 33	3211	44 49 37	3193

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
10	Fomalhaut	W.	111° 48′ 48″	3952	113° 13′ 56″	3963	114° 38′ 51″	3973	116° 3′ 34″	3983
	α Arietis	W.	50 49 43	3259	52 14 42	3256	53 39 45	3253	55 4 52	3249
	Regulus	E.	62 13 47	3043	60 44 28	3049	59 15 16	3054	57 46 10	3060
	Saturn	E.	66 51 21	3060	65 22 23	3066	63 53 32	3071	62 24 47	3076
	Mars	E.	93 58 42	3267	92 33 52	3273	91 9 9	3278	89 44 32	3283
11	α Arietis	W.	62 11 10	3940	63 36 32	3938	65 1 56	3937	66 27 21	3936
	Aldebaran	W.	30 12 4	3092	31 40 23	3092	33 8 42	3093	34 37 0	3093
	Regulus	E.	50 22 13	3082	48 53 41	3085	47 25 13	3088	45 56 49	3091
	Saturn	E.	55 2 24	3096	53 34 10	3099	52 5 59	3102	50 37 52	3105
	Mars	E.	82 42 45	3303	81 18 37	3306	79 54 33	3309	78 30 32	3311
	Sun	E.	131 54 10	3467	130 33 9	3470	129 12 11	3472	127 51 16	3474
12	α Arietis	W.	73 34 59	3926	75 0 37	3924	76 26 18	3921	77 52 2	3919
	Aldebaran	W.	41 58 27	3092	43 26 46	3091	44 55 6	3091	46 23 27	3088
	Regulus	E.	38 35 40	3103	37 7 34	3104	35 39 29	3105	34 11 26	3106
	Saturn	E.	43 17 54	3111	41 49 58	3112	40 22 3	3113	38 54 9	3113
	Mars	E.	71 30 56	3317	70 7 4	3317	68 43 12	3316	67 19 19	3315
	Venus	E.	97 45 26	3568	96 26 17	3568	95 7 8	3568	93 47 59	3567
	Sun	E.	121 7 0	3477	119 46 10	3476	118 25 19	3474	117 4 26	3472
13	Aldebaran	W.	53 45 57	3073	55 14 39	3069	56 43 26	3065	58 12 19	3060
	Regulus	E.	26 51 30	3113	25 23 36	3114	23 55 44	3116	22 27 54	3119
	Saturn	E.	31 34 28	3107	30 6 27	3105	28 38 24	3104	27 10 19	3101
	Mars	E.	60 19 27	3303	58 55 19	3300	57 31 7	3296	56 6 51	3291
	Spica	E.	80 54 2	3096	79 25 48	3093	77 57 30	3089	76 29 7	3084
	Venus	E.	87 11 40	3553	85 52 14	3548	84 32 43	3544	83 13 7	3538
	Sun	E.	110 19 27	3458	108 58 16	3454	107 37 0	3449	106 15 39	3444
14	Aldebaran	W.	65 38 26	3028	67 8 4	3020	68 37 52	3012	70 7 50	3003
	Mars	E.	49 3 58	3262	47 39 2	3254	46 13 57	3247	44 48 43	3239
	Spica	E.	69 5 42	3056	67 36 39	3050	66 7 28	3043	64 38 9	3036
	Venus	E.	76 33 29	3504	75 13 9	3496	73 52 40	3487	72 32 1	3478
	Sun	E.	99 27 12	3410	98 5 7	3401	96 42 52	3392	95 20 26	3382
15	Aldebaran	W.	77 40 35	2954	79 11 46	2942	80 43 12	2930	82 14 53	2918
	Pollux	W.	33 41 10	2999	35 11 24	2985	36 41 56	2969	38 12 47	2954
	Mars	E.	37 40 3	3193	36 13 46	3183	34 47 17	3173	33 20 36	3163
	Spica	E.	57 9 4	2993	55 38 42	2983	54 8 8	2973	52 37 21	2963
	Venus	E.	65 45 58	3423	64 24 7	3410	63 2 2	3398	61 39 43	3385
	Sun	E.	88 25 25	3329	87 1 47	3316	85 37 54	3303	84 13 46	3290
16	Aldebaran	W.	89 57 20	2851	91 30 42	2837	93 4 22	2821	94 38 22	2807
	Pollux	W.	45 51 55	2876	47 24 45	2860	48 57 55	2844	50 31 26	2828
	Mars	E.	26 4 2	3112	24 36 7	3103	23 8 1	3096	21 39 46	3088
	Spica	E.	45 0 16	2911	43 28 11	2901	41 55 53	2890	40 23 21	2880
	Venus	E.	54 44 9	3312	53 20 11	3295	51 55 54	3279	50 31 18	3263
	Sun	E.	77 9 5	3218	75 43 17	3202	74 17 10	3185	72 50 43	3169
17	Pollux	W.	58 24 28	2742	60 0 12	2724	61 36 20	2707	63 12 51	2688
	Spica	E.	32 37 37	2837	31 3 57	2831	29 30 10	2828	27 56 18	2827
	Venus	E.	43 23 20	3176	41 56 42	3158	40 29 42	3139	39 2 20	3121

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	III$^{\text{h}}$.	P. L. of Diff.	VI$^{\text{h}}$.	P. L. of Diff.	IX$^{\text{h}}$.	P. L. of Diff.
17	Sun	E.	71° 23′ 57″	3153	69° 56′ 51″	3136	68° 29′ 24″	3118	67° 1′ 36″	3100
18	Pollux	W.	64 49 47	2670	66 27 7	2652	68 4 51	2634	69 43 0	2615
	Regulus	W.	28 56 43	2688	30 33 39	2667	32 11 3	2646	33 48 55	2626
	Saturn	W.	23 51 11	2702	25 27 48	2680	27 4 55	2658	28 42 31	2638
	Venus	E.	37 34 36	3102	36 6 29	3084	34 38 0	3065	33 9 8	3047
	Sun	E.	59 37 3	3007	58 6 59	2989	56 36 32	2969	55 5 41	2950
19	Pollux	W.	78 0 6	2522	79 40 48	2504	81 21 55	2486	83 3 28	2467
	Regulus	W.	42 5 12	2525	43 45 50	2506	45 26 55	2487	47 8 27	2468
	Saturn	W.	36 57 29	2537	38 37 51	2517	40 18 41	2497	41 59 58	2478
	Sun	E.	47 25 20	2853	45 52 1	2835	44 18 18	2815	42 44 10	2796
20	Regulus	W.	55 42 44	2376	57 26 53	2358	59 11 28	2340	60 56 29	2322
	Saturn	W.	50 33 1	2386	52 16 56	2368	54 1 17	2350	55 46 3	2334
	Mars	W.	18 26 42	2642	20 4 40	2612	21 43 19	2583	23 22 37	2558
	Sun	E.	34 47 22	2705	33 10 49	2689	31 33 54	2672	29 56 37	2656
24	Sun	W.	19 49 13	2394	21 32 56	2389	23 16 47	2385	25 0 43	2383
	Fomalhaut	E.	71 50 3	2258	70 3 1	2264	68 16 8	2270	66 29 25	2279
	α Pegasi	E.	89 23 27	2460	87 41 18	2462	85 59 12	2465	84 17 10	2470
25	Sun	W.	33 40 23	2393	35 24 8	2398	37 7 46	2403	38 51 17	2409
	Fomalhaut	E.	57 39 33	2342	55 54 34	2359	54 10 1	2379	52 25 56	2401
	α Pegasi	E.	75 49 22	2516	74 8 31	2530	72 27 59	2545	70 47 49	2563
26	Sun	W.	47 26 19	2450	49 8 43	2460	50 50 53	2470	52 32 49	2480
	Fomalhaut	E.	43 54 28	2550	42 14 24	2590	40 35 15	2635	38 57 7	2685
	α Pegasi	E.	62 33 46	2678	60 56 36	2707	59 20 5	2739	57 44 17	2774
	α Arietis	E.	104 18 33	2277	102 31 59	2286	100 45 37	2294	98 59 28	2302
27	Sun	W.	60 58 33	2540	62 38 51	2552	64 18 52	2565	65 58 35	2579
	Jupiter	W.	26 27 46	2282	28 14 12	2294	30 0 20	2307	31 46 9	2320
	α Pegasi	E.	49 57 53	2996	48 27 35	3053	46 58 28	3115	45 30 37	3183
	α Arietis	E.	90 12 13	2355	88 27 34	2368	86 43 13	2380	84 59 10	2394
28	Sun	W.	74 12 30	2648	75 50 20	2663	77 27 50	2676	79 5 2	2690
	Jupiter	W.	40 30 32	2386	42 14 27	2399	43 58 3	2412	45 41 20	2426
	α Arietis	E.	76 23 55	2467	74 41 55	2483	73 0 18	2499	71 19 3	2515
	Aldebaran	E.	107 4 15	2327	105 18 55	2340	103 33 54	2353	101 49 12	2367
29	Sun	W.	87 6 14	2763	88 41 31	2777	90 16 29	2791	91 51 9	2805
	Jupiter	W.	54 12 52	2494	55 54 13	2508	57 35 15	2522	59 15 58	2535
	α Aquilæ	W.	47 19 12	3921	48 32 10	3856	49 46 14	3799	51 1 17	3747
	α Arietis	E.	62 58 45	2604	61 19 56	2624	59 41 33	2643	58 3 37	2664
	Aldebaran	E.	93 10 32	2433	91 27 45	2447	89 45 17	2460	88 3 8	2473
30	Sun	W.	99 39 53	2874	101 12 45	2888	102 45 19	2901	104 17 36	2915
	Jupiter	W.	67 34 57	2601	69 13 51	2613	70 52 28	2626	72 30 48	2639
	α Aquilæ	W.	57 28 8	3569	58 47 16	3545	60 6 50	3525	61 26 47	3506
	α Arietis	E.	50 1 7	2777	48 26 9	2803	46 51 45	2829	45 17 55	2858
	Aldebaran	E.	79 36 56	2538	77 56 35	2551	76 16 32	2564	74 36 47	2576

GREENWICH MEAN TIME

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh	P. L. of Diff.	XXIh.	P. L. of Diff.
17	SUN	E.	65° 33′ 26″	3083	64° 4′ 54″	3064	62° 36′ 0″	3045	61° 6′ 43″	3026
18	Pollux	W.	71 21 35	2596	73 0 35	2578	74 40 0	2560	76 19 50	2541
	Regulus	W.	35 27 15	2605	37 6 3	2585	38 45 19	2565	40 25 2	2545
	SATURN	W.	30 20 35	2617	31 59 7	2596	33 38 7	2577	35 17 34	2556
	VENUS	E.	31 39 53	3029	30 10 16	3010	28 40 16	2993	27 9 54	2974
	SUN	E.	53 34 26	2931	52 2 47	2912	50 30 43	2892	48 58 14	2873
19	Pollux	W.	84 45 27	2450	86 27 51	2431	88 10 41	2414	89 53 56	2396
	Regulus	W.	48 50 25	2449	50 32 50	2430	52 15 42	2412	53 59 0	2394
	SATURN	W.	43 41 42	2460	45 23 52	2441	47 6 29	2422	48 49 32	2404
	SUN	E.	41 9 37	2778	39 34 40	2759	37 59 18	2741	36 23 32	2723
20	Regulus	W.	62 41 55	2307	64 27 45	2291	66 13 58	2274	68 0 35	2260
	SATURN	W.	57 31 13	2317	59 16 47	2300	61 2 46	2284	62 49 9	2268
	MARS	W.	25 2 30	2534	26 42 56	2512	28 23 53	2491	30 5 19	2470
	SUN	E.	28 18 58	2641	26 40 59	2626	25 2 40	2613	23 24 3	2601
24	SUN	W.	26 44 42	2383	28 28 41	2384	30 12 39	2387	31 56 33	2389
	Fomalhaut	E.	64 42 54	2288	62 56 37	2300	61 10 37	2312	59 24 55	2326
	α Pegasi	E.	82 35 15	2477	80 53 29	2484	79 11 53	2493	77 30 30	2504
25	SUN	W.	40 34 39	2416	42 17 51	2424	44 0 52	2431	45 43 42	2441
	Fomalhaut	E.	50 42 23	2425	48 59 24	2451	47 17 2	2481	45 35 22	2514
	α Pegasi	E.	69 8 3	2582	67 28 43	2603	65 49 52	2626	64 11 32	2651
26	SUN	W.	54 14 30	2492	55 55 55	2503	57 37 4	2515	59 17 57	2527
	Fomalhaut	E.	37 20 7	2741	35 44 22	2805	34 10 0	2876	32 37 11	2959
	α Pegasi	E.	56 9 15	2811	54 35 1	2852	53 1 40	2896	51 29 16	2944
	α Arietis	E.	97 13 32	2311	95 27 49	2322	93 42 21	2333	91 57 9	2344
27	SUN	W.	67 37 59	2593	69 17 4	2606	70 55 51	2619	72 34 20	2633
	JUPITER	W.	33 31 39	2333	35 16 51	2346	37 1 44	2359	38 46 18	2373
	α Pegasi	E.	44 4 8	3259	42 39 8	3341	41 15 44	3431	39 54 3	3533
	α Arietis	E.	83 15 27	2408	81 32 3	2422	79 49 0	2436	78 6 17	2451
28	SUN	W.	80 41 55	2704	82 18 29	2719	83 54 43	2734	85 30 38	2748
	JUPITER	W.	47 24 17	2440	49 6 55	2454	50 49 13	2467	52 31 12	2481
	α Arietis	E.	69 38 11	2533	67 57 43	2550	66 17 39	2568	64 38 0	2585
	Aldebaran	E.	100 4 50	2380	98 20 47	2394	96 37 3	2407	94 53 38	2420
29	SUN	W.	93 25 30	2820	94 59 32	2834	96 33 16	2847	98 6 43	2860
	JUPITER	W.	60 56 22	2548	62 36 28	2561	64 16 16	2575	65 55 45	2588
	α Aquilæ	W.	52 17 14	3702	53 33 59	3663	54 51 26	3628	56 9 30	3597
	α Arietis	E.	56 26 9	2685	54 49 9	2707	53 12 38	2729	51 36 37	2753
	Aldebaran	E.	86 21 17	2486	84 39 44	2499	82 58 30	2512	81 17 34	2525
30	SUN	W.	105 49 36	2927	107 21 20	2941	108 52 47	2954	110 23 58	2966
	JUPITER	W.	74 8 50	2652	75 46 35	2663	77 24 4	2675	79 1 18	2687
	α Aquilæ	W.	62 47 4	3491	64 7 38	3478	65 28 27	3466	66 49 29	3456
	α Arietis	E.	43 44 42	2886	42 12 8	2920	40 40 15	2955	39 9 6	2993
	Aldebaran	E.	72 57 19	2588	71 18 7	2599	69 39 11	2612	68 0 32	2624

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.		Added to Apparent Time.	
		h m s	s	° ′ ″	″	′ ″	s	m s	s
SUN.	1	16 31 26.94	10.811	S. 21 53 36.3	−22.82	16 16.05	70.34	10 39.18	0.953
Mon.	2	16 35 46.72	10.837	22 2 31.4	21.76	16 16.20	70.43	10 16.03	0.978
Tues.	3	16 40 7.10	10.861	22 11 1.0	20.68	16 16.35	70.51	9 52.28	1.002
Wed.	4	16 44 28.05	10.885	22 19 4.8	−19.60	16 16.49	70.58	9 27.95	1.026
Thur.	5	16 48 49.55	10.907	22 26 42.5	18.51	16 16.63	70.66	9 3.07	1.048
Frid.	6	16 53 11.58	10.928	22 33 53.9	17.41	16 16.76	70.73	8 37.66	1.069
Sat.	7	16 57 34.10	10.948	22 40 38.8	−16.31	16 16.88	70.80	8 11.76	1.089
SUN.	8	17 1 57.11	10.968	22 46 57.1	15.19	16 17.00	70.86	7 45.38	1.109
Mon.	9	17 6 20.59	10.986	22 52 48.4	14.07	16 17.12	70.92	7 18.54	1.127
Tues.	10	17 10 44.50	11.004	22 58 12.6	−12.94	16 17.23	70.98	6 51.26	1.145
Wed.	11	17 15 8.82	11.020	23 3 9.5	11.80	16 17.33	71.03	6 23.57	1.161
Thur.	12	17 19 33.53	11.036	23 7 39.1	10.66	16 17.43	71.08	5 55.50	1.177
Frid.	13	17 23 58.59	11.050	23 11 41.1	− 9.51	16 17.52	71.12	5 27.08	1.191
Sat.	14	17 28 23.97	11.063	23 15 15.4	8.36	16 17.61	71.16	4 58.33	1.204
SUN.	15	17 32 49.64	11.074	23 18 21.9	7.20	16 17.69	71.19	4 29.30	1.215
Mon.	16	17 37 15.57	11.085	23 21 0.5	− 6.03	16 17.77	71.22	4 0.01	1.226
Tues.	17	17 41 41.73	11.094	23 23 11.0	4.85	16 17.84	71.24	3 30.49	1.234
Wed.	18	17 46 8.08	11.101	23 24 53.5	3.68	16 17.91	71.26	3 0.77	1.241
Thur.	19	17 50 34.58	11.106	23 26 7.8	− 2.50	16 17.97	71.28	2 30.91	1.246
Frid.	20	17 55 1.20	11.111	23 26 53.9	1.32	16 18.03	71.29	2 0.94	1.251
Sat.	21	17 59 27.91	11.113	23 27 11.6	− 0.14	16 18.09	71.30	1 30.88	1.253
SUN.	22	18 3 54.65	11.114	23 27 0.9	+ 1.04	16 18.14	71.30	1 0.77	1.254
Mon.	23	18 8 21.39	11.113	23 26 21.9	2.22	16 18.19	71.30	0 30.67	1.253
Tues.	24	18 12 48.08	11.111	23 25 14.6	3.40	16 18.23	71.29	0 0.62	1.251
Wed.	25	18 17 14.69	11.107	23 23 39.0	+ 4.58	16 18.27	71.28	0 29.35	1.247
Thur.	26	18 21 41.19	11.101	23 21 35.1	5.75	16 18.31	71.26	0 59.21	1.241
Frid.	27	18 26 7.54	11.094	23 19 3.0	6.92	16 18.34	71.24	1 28.92	1.234
Sat.	28	18 30 33.69	11.086	23 16 2.8	+ 8.09	16 18.37	71.22	1 58.44	1.226
SUN.	29	18 34 59.62	11.076	23 12 34.6	9.26	16 18.39	71.19	2 27.73	1.216
Mon.	30	18 39 25.29	11.064	23 8 38.5	10.42	16 18.41	71.16	2 56.76	1.204
Tues.	31	18 43 50.67	11.051	23 4 14.5	11.58	16 18.42	71.12	3 25.50	1.191
Wed.	32	18 48 15.72	11.037	S. 22 59 22.8	+12.74	16 18.43	71.08	3 53.92	1.177

NOTE.—The mean time of semidiameter passing may be found by subtracting $0^s.19$ from the sidereal time. The sign — prefixed to the hourly change of declination indicates that south declinations are increasing; the sign + indicates that south declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Equation of Time, to be Added to / Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ′ ″	″	m s	s	h m s
SUN.	1	16 31 28.86	10.809	S. 21 53 40.4	−22.81	10 39.01	0.953	16 42 7.87
Mon.	2	16 35 48.57	10.834	22 2 35.2	21.75	10 15.86	0 978	16 46 4.43
Tues.	3	16 40 8.88	10.858	22 11 4.5	20.67	9 52.11	1.002	16 50 0.99
Wed.	4	16 44 29.76	10.882	22 19 7.9	−19.59	9 27.78	1.026	16 53 57.54
Thur.	5	16 48 51.19	10.904	22 26 45.3	18.50	9 2.91	1.048	16 57 54.10
Frid.	6	16 53 13.15	10.925	22 33 56.4	17.40	8 37.51	1.069	17 1 50.66
Sat.	7	16 57 35.60	10.945	22 40 41.0	−16.30	8 11.61	1.089	17 5 47.21
SUN.	8	17 1 58.53	10.965	22 46 59.0	15.18	7 45.24	1.109	17 9 43.77
Mon.	9	17 6 21.93	10.983	22 52 50.0	14.06	7 18.40	1.127	17 13 40.33
Tues.	10	17 10 45.76	11.001	22 58 14.0	−12.93	6 51.13	1.145	17 17 36.89
Wed.	11	17 15 10.00	11.017	23 3 10.7	11.79	6 23.45	1.161	17 21 33.45
Thur.	12	17 19 34.62	11.033	23 7 40.1	10.65	5 55.38	1.177	17 25 30.00
Frid.	13	17 23 59.59	11.047	23 11 41.9	− 9.50	5 26.97	1.191	17 29 26.56
Sat.	14	17 28 24.89	11.060	23 15 16.1	8.35	4 58.23	1.204	17 33 23.12
SUN.	15	17 32 50.47	11.071	23 18 22.5	7.19	4 29.21	1.215	17 37 19.68
Mon	16	17 37 16.31	11.082	23 21 0.9	− 6.02	3 59.93	1.226	17 41 16.24
Tues.	17	17 41 42.38	11.090	23 23 11.3	4.85	3 30.42	1.234	17 45 12.80
Wed.	18	17 46 8.64	11.097	23 24 53.7	3.68	3 0.71	1.241	17 49 9.35
Thur.	19	17 50 35.05	11.102	23 26 7.9	− 2.50	2 30.86	1.246	17 53 5.91
Frid.	20	17 55 1.58	11.106	23 26 53.8	1.32	2 0.90	1.251	17 57 2.47
Sat.	21	17 59 28.19	11.109	23 27 11.5	− 0.14	1 30.85	1.253	18 0 59.03
SUN.	22	18 3 54.83	11.110	23 27 0.8	+ 1.04	1 0.75	1.254	18 4 55.58
Mon.	23	18 8 21.48	11.109	23 26 21.9	2.22	0 30.66	1.253	18 8 52.14
Tues.	24	18 12 48.08	11.107	23 25 14.6	3.40	0 0.62	1.251	18 12 48.70
Wed.	25	18 17 14.60	11.103	23 23 39.0	+ 4.58	0 29.34	1.247	18 16 45.26
Thur.	26	18 21 41.01	11.097	23 21 35.2	5.75	0 59.19	1.241	18 20 41.82
Frid.	27	18 26 7.27	11.090	23 19 3.2	6.92	1 28.89	1.234	18 24 38.38
Sat.	28	18 30 33.33	11.082	23 16 3.1	+ 8.09	1 58.40	1.226	18 28 34.93
SUN.	29	18 34 59.17	11.072	23 12 35.0	9.26	2 27.68	1.216	18 32 31.49
Mon.	30	18 39 24.75	11.060	23 8 39.0	10.42	2 56.70	1.204	18 36 28.05
Tues.	31	18 43 50.04	11.047	23 4 15.1	11.58	3 25.43	1.191	18 40 24.61
Wed.	32	18 48 15.01	11.033	S. 22 59 23.6	+12.74	3 53.84	1.177	18 44 21.16

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign — prefixed to the hourly change of declination indicates that south declinations are increasing; the sign + indicates that south declinations are decreasing.

Diff. for 1 Hour,
$+ 9^s.8565$.
(Table III.)

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		λ	λ′					
		° ′ ″	′ ″	″	″			h m s
1	335	249 32 49.0	32 21.0	152.16	− 0.62	9.9937039	−28.8	7 16 40.39
2	336	250 33 41.2	33 13.1	152.19	0.62	9.9936358	27.9	7 12 44.48
3	337	251 34 34.3	34 6.1	152.22	0.59	9.9935699	27.0	7 8 48.57
4	338	252 35 28.2	34 59.8	152.26	− 0.53	9.9935064	−26.0	7 4 52.66
5	339	253 36 22.9	35 54.3	152.30	0.44	9.9934453	25.0	7 0 56.74
6	340	254 37 18.4	36 49.6	152.34	0.33	9.9933868	23.9	6 57 0.83
7	341	255 38 14.8	37 45.9	152.37	− 0.20	9.9933308	−22.8	6 53 4.92
8	342	256 39 12.1	38 43.0	152.41	− 0.07	9.9932774	21.7	6 49 9.01
9	343	257 40 10.4	39 41.1	152.45	+ 0.06	9.9932268	20.6	6 45 13.10
10	344	258 41 9.6	40 40.1	152.49	+ 0.19	9.9931788	−19.5	6 41 17.19
11	345	259 42 9.8	41 40.1	152.53	0.31	9.9931334	18.4	6 37 21.28
12	346	260 43 11.0	42 41.2	152.57	0.42	9.9930905	17.4	6 33 25.37
13	347	261 44 13.2	43 43.2	152.61	+ 0.50	9.9930500	−16.4	6 29 29.45
14	348	262 45 16.4	44 46.2	152.65	0.56	9.9930118	15.4	6 25 33.54
15	349	263 46 20.6	45 50.2	152.69	0.58	9.9929759	14.5	6 21 37.63
16	350	264 47 25.7	46 55.2	152.73	+ 0.57	9.9929421	−13.7	6 17 41.72
17	351	265 48 31.7	48 1.0	152.77	0.52	9.9929102	12.9	6 13 45.81
18	352	266 49 38.5	49 7.6	152.80	0.46	9.9928802	12.1	6 9 49.90
19	353	267 50 46.0	50 14.9	152.83	+ 0.38	9.9928520	−11.4	6 5 53.99
20	354	268 51 54.2	51 22.9	152.85	0.27	9.9928255	10.7	6 1 58.08
21	355	269 53 2.9	52 31.5	152.88	0.14	9.9928007	10.0	5 58 2.16
22	356	270 54 12.2	53 40.6	152.90	+ 0.01	9.9927776	− 9.3	5 54 6.25
23	357	271 55 21.9	54 50.1	152.91	− 0.11	9.9927561	8.6	5 50 10.34
24	358	272 56 31.9	55 59.9	152.92	0.22	9.9927361	8.0	5 46 14.43
25	359	273 57 42.0	57 9.8	152.92	− 0.33	9.9927178	− 7.3	5 42 18.51
26	360	274 58 52.2	58 19.8	152.92	0.41	9.9927014	6.5	5 38 22.60
27	361	275 60 2.4	59 29.8	152.92	0.48	9.9926868	5.7	5 34 26.69
28	362	277 1 12.4	0 39.7	152.92	− 0.52	9.9926742	− 4.8	5 30 30.78
29	363	278 2 22.4	1 49.5	152.92	0.53	9.9926637	3.9	5 26 34.86
30	364	279 3 32.2	2 59.1	152.91	0.49	9.9926553	3.0	5 22 38.95
31	365	280 4 41.8	4 8.5	152.90	0.44	9.9926493	2.0	5 18 43.04
32	366	281 5 51.1	5 17.7	152.88	− 0.35	9.9926458	− 0.9	5 14 47.13

NOTE.—The numbers in column λ correspond to the true equinox of the date; in column λ′, to the mean equinox of January $0^d.0$.

Diff. for 1 Hour, $-9^s.8296$. (Table II.)

GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	15 34.6	15 29.5	57 3.2	−1.60	56 44.5	−1.53	7 46.2	1.89	8.4
2	15 24.6	15 20.0	56 26.6	1.45	56 9.8	1.36	8 30.9	1.85	9.4
3	15 15.7	15 11.7	55 54.0	1.28	55 39.2	1.19	9 15.2	1.85	10.4
4	15 7.9	15 4.4	55 25.4	−1.11	55 12.5	−1.03	9 59.9	1.88	11.4
5	15 1.2	14 58.2	55 0.6	0.95	54 49.7	0.87	10 45.5	1.93	12.4
6	14 55.5	14 53.0	54 39.8	0.79	54 30.7	0.71	11 32.5	1.99	13.4
7	14 50.8	14 48.9	54 22.7	−0.63	54 15.7	−0.54	12 20.9	2.04	14.4
8	14 47.4	14 46.1	54 9.9	0.44	54 5.3	0.33	13 10 1	2.06	15.4
9	14 45.2	14 44.7	54 2.0	−0.21	54 0.2	−0.09	13 59.6	2.05	16.4
10	14 44.6	14 45 1	53 59.9	+0.05	54 1.4	+0.20	14 48.5	2.02	17.4
11	14 45 9	14 47.4	54 4.7	0.36	54 9.9	0.52	15 36.2	1.96	18.4
12	14 49.4	14 51.9	54 17.2	0.70	54 26.7	0.89	16 22.6	1.90	19.4
13	14 55.2	14 59.0	54 38.5	+1.08	54 52.6	+1.27	17 7.6	1.85	20.4
14	15 3.5	15 8.6	55 9.0	1.47	55 27.8	1.66	17 51.9	1.84	21.4
15	15 14.3	15 20.6	55 48.8	1.84	56 12.0	2.01	18 36.1	1.85	22.4
16	15 27.4	15 34.7	56 37.1	+2.16	57 3.9	+2.29	19 21.2	1.92	23.4
17	15 42.4	15 50.3	57 32.0	2.38	58 1.0	2.43	20 8.4	2.03	24.4
18	15 58.3	16 6.2	58 30.4	2.44	58 59.5	2.39	20 58.9	2.20	25.4
19	16 13.9	16 21.1	59 27.7	+2.29	59 54.3	+2.12	21 53.7	2.38	26.4
20	16 27.7	16 33.5	60 18.5	1.89	60 39.6	1.60	22 53.1	2.58	27.4
21	16 38.2	16 41.8	60 56.9	1.27	61 10.1	0.89	23 56.6	2.71	28.4
22	16 44.0	16 44.9	61 18.3	+0.48	61 21.6	+0.06	δ		29.4
23	16 44.4	16 42.5	61 19.7	−0.37	61 12.8	−0.77	1 2.0	2.72	1.0
24	16 39.4	16 35.1	61 1.3	1.13	60 45.6	1.46	2 6.5	2.62	2.0
25	16 29.9	16 23.8	60 26.4	−1.74	60 4.1	−1.95	3 7.4	2.44	3.0
26	16 17.1	16 10.1	59 39.6	2.10	59 13.6	2.20	4 3.8	2.24	4.0
27	16 2 8	15 55.3	58 46.9	2.25	58 19.5	2.25	4 55.6	2.07	5.0
28	15 48.1	15 40.9	57 52.8	−2.21	57 26.6	−2.14	5 43.8	1.95	6.0
29	15 34.1	15 27.6	57 1.5	2.04	56 37.7	1.92	6 29.6	1.87	7.0
30	15 21.6	15 16.0	56 15.5	1.79	55 54.9	1.64	7 14.2	1.84	8.0
31	15 10.8	15 6.2	55 36.1	1.49	55 19.1	1.34	7 58.5	1.86	9.0
32	15 2.1	14 58.4	55 3.9	−1.20	54 50.4	−1.05	8 43.4	1.90	10.0

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	SUNDAY 1.					TUESDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	0 14 3.57	2.0138	S. 4 11 38.5	13.007	0	1 48 38.15	1.9516	N. 6 4 42.8	12.336
1	0 16 4.31	2.0109	3 58 37.8	13.015	1	1 50 35.25	1.9518	6 17 1.9	12.301
2	0 18 4.88	2.0081	3 45 36.7	13.021	2	1 52 32.37	1.9521	6 29 18.9	12.266
3	0 20 5.28	2.0053	3 32 35.3	13.026	3	1 54 29.50	1.9524	6 41 33.8	12.230
4	0 22 5.52	2.0027	3 19 33.6	13.031	4	1 56 26.65	1.9528	6 53 46.5	12.192
5	0 24 5.61	2.0002	3 6 31.6	13.035	5	1 58 23.83	1.9532	7 5 56.9	12.154
6	0 26 5.54	1.9977	2 53 29.4	13.037	6	2 0 21.03	1.9536	7 18 5.0	12.115
7	0 28 5.33	1.9952	2 40 27.1	13.038	7	2 2 18.26	1.9541	7 30 10.7	12.075
8	0 30 4.97	1.9928	2 27 24.8	13.039	8	2 4 15.52	1.9547	7 42 14.0	12.035
9	0 32 4.47	1.9905	2 14 22.4	13.039	9	2 6 12.82	1.9553	7 54 14.9	11.994
10	0 34 3.83	1.9883	2 1 20.1	13.038	10	2 8 10.16	1.9560	8 6 13.3	11.952
11	0 36 3.06	1.9862	1 48 17.8	13.037	11	2 10 7.54	1.9567	8 18 9.1	11.909
12	0 38 2.17	1.9841	1 35 15.7	13.033	12	2 12 4.96	1.9574	8 30 2.4	11.866
13	0 40 1.15	1.9820	1 22 13.8	13.029	13	2 14 2.43	1.9583	8 41 53.0	11.821
14	0 42 0.01	1.9801	1 9 12.2	13.024	14	2 15 59.95	1.9592	8 53 40.9	11.776
15	0 43 58.76	1.9782	0 56 10.9	13.018	15	2 17 57.53	1.9601	9 5 26.1	11.730
16	0 45 57.40	1.9764	0 43 10.0	13.012	16	2 19 55.16	1.9610	9 17 8.5	11.683
17	0 47 55.93	1.9746	0 30 9.5	13.003	17	2 21 52.85	1.9619	9 28 48.1	11.636
18	0 49 54.35	1.9729	0 17 9.6	12.994	18	2 23 50.59	1.9629	9 40 24.8	11.587
19	0 51 52.67	1.9712	S. 0 4 10.2	12.985	19	2 25 48.40	1.9641	9 51 58.6	11.538
20	0 53 50.90	1.9697	N. 0 8 48.6	12.975	20	2 27 46.28	1.9652	10 3 29.4	11.489
21	0 55 49.04	1.9682	0 21 46.8	12.964	21	2 29 44.23	1.9664	10 14 57.3	11.439
22	0 57 47.09	1.0668	0 34 44.3	12.952	22	2 31 42.25	1.9676	10 26 22.1	11.387
23	0 59 45.06	1.9655	N. 0 47 41.0	12.938	23	2 33 40.34	1.9688	N.10 37 43.7	11.334
	MONDAY 2.					WEDNESDAY 4.			
0	1 1 42.95	1.9642	N. 1 0 36.9	12.924	0	2 35 38.51	1.9701	N.10 49 2.2	11.281
1	1 3 40.76	1.9629	1 13 31.9	12.910	1	2 37 36.76	1.9715	11 0 17.5	11.227
2	1 5 38.50	1.9618	1 26 26.1	12.895	2	2 39 35.09	1.9728	11 11 29.5	11.173
3	1 7 36.17	1.9607	1 39 19.3	12.878	3	2 41 33.50	1.9742	11 22 38.3	11.118
4	1 9 33.78	1.9597	1 52 11.4	12.860	4	2 43 32.00	1.9757	11 33 43.7	11.062
5	1 11 31.33	1.9587	2 5 2.5	12.842	5	2 45 30.59	1.9772	11 44 45.8	11.006
6	1 13 28.82	1.9578	2 17 52.5	12.823	6	2 47 29.26	1.9787	11 55 44.4	10.948
7	1 15 26.26	1.9569	2 30 41.3	12.803	7	2 49 28.03	1.9802	12 6 39.5	10.889
8	1 17 23.65	1.9561	2 43 28.9	12.782	8	2 51 26.89	1.9818	12 17 31.1	10.831
9	1 19 20.99	1.9553	2 56 15.2	12.760	9	2 53 25.85	1.9835	12 28 19.2	10.771
10	1 21 18.29	1.9547	3 9 0.1	12.738	10	2 55 24.91	1.9851	12 39 3.6	10.710
11	1 23 15.56	1.9542	3 21 43.7	12.715	11	2 57 24.07	1.9868	12 49 44.4	10.649
12	1 25 12.79	1.9536	3 34 25.9	12.691	12	2 59 23.33	1.9886	13 0 21.5	10.587
13	1 27 9.99	1.9531	3 47 6.6	12.666	13	3 1 22.70	1.9903	13 10 54.9	10.525
14	1 29 7.16	1.9527	3 59 45.8	12.640	14	3 3 22.17	1.9920	13 21 24.5	10.461
15	1 31 4.31	1.9523	4 12 23.4	12.613	15	3 5 21.74	1.9938	13 31 50.2	10.396
16	1 33 1.44	1.9520	4 24 59.4	12.586	16	3 7 21.42	1.9957	13 42 12.0	10.331
17	1 34 58.55	1.9517	4 37 33.7	12.557	17	3 9 21.22	1.9976	13 52 29.9	10.265
18	1 36 55.65	1.9516	4 50 6.3	12.528	18	3 11 21.13	1.9994	14 2 43.8	10.199
19	1 38 52.74	1.9514	5 2 37.1	12.498	19	3 13 21.15	2,0013	14 12 53.7	10.132
20	1 40 49.82	1.9513	5 15 6.1	12.467	20	3 15 21.29	2.0033	14 22 59.6	10.064
21	1 42 46.90	1.9513	5 27 33.2	12.436	21	3 17 21.55	2.0052	14 33 1.4	9.995
22	1 44 43.98	1.9513	5 39 58.4	12.403	22	3 19 21.92	2.0072	14 42 59.0	9.925
23	1 46 41.06	1.9514	5 52 21.6	12.370	23	3 21 22.41	2.0092	14 52 52.4	9.855
24	1 48 38.15	1.9516	N. 6 4 42.8	12.336	24	3 23 23.03	2.0113	N.15 2 41.6	9.785

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	THURSDAY 5.					**SATURDAY 7.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	3 23 23.03	2.0113	N.15 2 41.6	9.785	0	5 2 25.82	2.1142	N.21 17 43.7	5.602
1	3 25 23.77	2.0133	15 12 26.6	9.713	1	5 4 32.73	2.1161	21 23 16.8	5.501
2	3 27 24.63	2.0154	15 22 7.2	9.640	2	5 6 39.75	2.1180	21 28 43.8	5.399
3	3 29 25.62	2.0175	15 31 43.4	9.567	3	5 8 46.89	2.1198	21 34 4.7	5.297
4	3 31 26.73	2.0196	15 41 15.2	9.493	4	5 10 54.13	2.1216	21 39 19.4	5.194
5	3 33 27.97	2.0217	15 50 42.6	9.419	5	5 13 1.48	2.1233	21 44 27.9	5.090
6	3 35 29.33	2.0238	16 0 5.5	9.344	6	5 15 8.93	2.1250	21 49 30.2	4.987
7	3 37 30.82	2.0259	16 9 23.9	9.268	7	5 17 16.48	2.1267	21 54 26.3	4.883
8	3 39 32.44	2.0281	16 18 37.7	9.192	8	5 19 24.13	2.1283	21 59 16.2	4.779
9	3 41 34.19	2.0303	16 27 46.9	9.114	9	5 21 31.88	2.1299	22 3 59.8	4.675
10	3 43 36.08	2.0326	16 36 51.4	9.036	10	5 23 39.72	2.1314	22 8 37.2	4.570
11	3 45 38.10	2.0348	16 45 51.2	8.957	11	5 25 47.65	2.1330	22 13 8.2	4.464
12	3 47 40.25	2.0369	16 54 46.3	8.878	12	5 27 55.68	2.1346	22 17 32.9	4.358
13	3 49 42.53	2.0391	17 3 36.6	8.798	13	5 30 3.80	2.1360	22 21 51.2	4.252
14	3 51 44.94	2.0413	17 12 22.1	8.717	14	5 32 12.00	2.1373	22 26 3.1	4.146
15	3 53 47.49	2.0436	17 21 2.7	8.636	15	5 34 20.28	2.1387	22 30 8.7	4.039
16	3 55 50.17	2.0458	17 29 38.4	8.554	16	5 36 28.64	2.1400	22 34 7.8	3.932
17	3 57 52.99	2.0481	17 38 9.2	8.471	17	5 38 37.08	2.1413	22 38 0.5	3.824
18	3 59 55.94	2.0503	17 46 35.0	8.387	18	5 40 45.60	2.1426	22 41 46.7	3.716
19	4 1 59.03	2.0526	17 54 55.7	8.303	19	5 42 54.19	2.1439	22 45 26.5	3.608
20	4 4 2.25	2.0548	18 3 11.4	8.219	20	5 45 2.86	2.1451	22 48 59.7	3.499
21	4 6 5.60	2.0570	18 11 22.0	8.133	21	5 47 11.60	2.1462	22 52 26.4	3.391
22	4 8 9.09	2.0593	18 19 27.4	8.047	22	5 49 20.40	2.1472	22 55 46.6	3.282
23	4 10 12.72	2.0616	N.18 27 27.7	7.961	23	5 51 29.27	2.1483	N.22 59 0.2	3.172
	FRIDAY 6.					**SUNDAY 8.**			
0	4 12 16.48	2.0638	N.18 35 22.8	7.874	0	5 53 38.20	2.1493	N.23 2 7.2	3.062
1	4 14 20.38	2.0661	18 43 12.6	7.786	1	5 55 47.19	2.1502	23 5 7.6	2.952
2	4 16 24.41	2.0683	18 50 57.1	7.697	2	5 57 56.23	2.1511	23 8 1.5	2.843
3	4 18 28.57	2.0705	18 58 36.2	7.608	3	6 0 5.32	2.1519	23 10 48.8	2.733
4	4 20 32.87	2.0727	19 6 10.0	7.518	4	6 2 14.46	2.1528	23 13 29.5	2.622
5	4 22 37.30	2.0749	19 13 38.4	7.427	5	6 4 23.65	2.1536	23 16 3.5	2.512
6	4 24 41.86	2.0771	19 21 1.3	7.336	6	6 6 32.89	2.1543	23 18 30.9	2.401
7	4 26 46.55	2.0793	19 28 18.7	7.244	7	6 8 42.17	2.1549	23 20 51.6	2.289
8	4 28 51.38	2.0816	19 35 30.6	7.152	8	6 10 51.48	2.1555	23 23 5.6	2.178
9	4 30 56.34	2.0838	19 42 37.0	7.060	9	6 13 0.83	2.1561	23 25 13.0	2.067
10	4 33 1.43	2.0859	19 49 37.8	6.967	10	6 15 10.21	2.1566	23 27 13.7	1.956
11	4 35 6.65	2.0881	19 56 33.0	6.872	11	6 17 19.62	2.1571	23 29 7.7	1.844
12	4 37 12.00	2.0902	20 3 22.5	6.777	12	6 19 29.06	2.1575	23 30 55.0	1.732
13	4 39 17.48	2.0923	20 10 6.3	6.682	13	6 21 38.52	2.1578	23 32 35.6	1.621
14	4 41 23.08	2.0944	20 16 44.4	6.587	14	6 23 48.00	2.1581	23 34 9.5	1.509
15	4 43 28.81	2.0965	20 23 16.8	6.491	15	6 25 57.50	2.1584	23 35 36.7	1.397
16	4 45 34.66	2.0986	20 29 43.4	6.394	16	6 28 7.01	2.1587	23 36 57.1	1.284
17	4 47 40.64	2.1007	20 36 4.1	6.297	17	6 30 16.54	2.1589	23 38 10.8	1.172
18	4 49 46.74	2.1027	20 42 19.0	6.199	18	6 32 26.08	2.1590	23 39 17.8	1.060
19	4 51 52.96	2.1047	20 48 28.0	6.101	19	6 34 35.62	2.1590	23 40 18.0	0.948
20	4 53 59.30	2.1067	20 54 31.1	6.002	20	6 36 45.16	2.1590	23 41 11.5	0.836
21	4 56 5.76	2.1086	21 0 28.2	5.903	21	6 38 54.70	2.1590	23 41 58.3	0.723
22	4 58 12.33	2.1105	21 6 19.4	5.803	22	6 41 4.24	2.1589	23 42 38.3	0.611
23	5 0 19.02	2.1124	21 12 4.6	5.702	23	6 43 13.77	2.1587	23 43 11.6	0.499
24	5 2 25.82	2.1142	N.21 17 43.7	5.602	24	6 45 23.29	2.1585	N.23 43 38.2	0.387

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	MONDAY 9.					**WEDNESDAY 11.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	6 45 23.29	2.1586	N.23 43 38.2	0.387	0	8 27 53.58	2.0971	N.21 55 29.6	4.793
1	6 47 32.80	2.1583	23 43 58.0	0.274	1	8 29 59.34	2.0950	21 50 39.0	4.893
2	6 49 42.29	2.1580	23 44 11.1	0.162	2	8 32 4.98	2.0929	21 45 42.4	4.993
3	6 51 51.76	2.1577	23 44 17.4	+ 0.049	3	8 34 10.49	2.0907	21 40 39.8	5.092
4	6 54 1.21	2.1573	23 44 17.0	− 0.062	4	8 36 15.87	2.0886	21 35 31.3	5.191
5	6 56 10.64	2.1569	23 44 9.9	0.174	5	8 38 21.12	2.0865	21 30 16.9	5.289
6	6 58 20.04	2.1564	23 43 56.1	0.286	6	8 40 26.25	2.0843	21 24 56.6	5.387
7	7 0 29.41	2.1558	23 43 35.6	0.398	7	8 42 31.24	2.0821	21 19 30.5	5.484
8	7 2 38.74	2.1552	23 43 8.3	0.511	8	8 44 36.10	2.0798	21 13 58.5	5.581
9	7 4 48.04	2.1546	23 42 34.3	0.623	9	8 46 40.82	2.0776	21 8 20.7	5.677
10	7 6 57.30	2.1539	23 41 53.6	0.734	10	8 48 45.41	2.0753	21 2 37.2	5.773
11	7 9 6.51	2.1532	23 41 6.2	0.845	11	8 50 49.86	2.0731	20 56 48.0	5.868
12	7 11 15.68	2.1524	23 40 12.2	0.956	12	8 52 54.18	2.0708	20 50 53.0	5.963
13	7 13 24.80	2.1516	23 39 11.5	1.067	13	8 54 58.36	2.0686	20 44 52.4	6.058
14	7 15 33.87	2.1507	23 38 4.1	1.178	14	8 57 2.41	2.0663	20 38 46.1	6.152
15	7 17 42.88	2.1498	23 36 50.1	1.289	15	8 59 6.32	2.0640	20 32 34.2	6.245
16	7 19 51.84	2.1488	23 35 29.4	1.400	16	9 1 10.09	2.0617	20 26 16.7	6.338
17	7 22 0.74	2.1477	23 34 2.1	1.511	17	9 3 13.73	2.0595	20 19 53.6	6.431
18	7 24 9.57	2.1467	23 32 28.1	1.622	18	9 5 17.23	2.0572	20 13 25.0	6.523
19	7 26 18.34	2.1456	23 30 47.5	1.732	19	9 7 20.59	2.0549	20 6 50.9	6.614
20	7 28 27.04	2.1444	23 29 0.3	1.841	20	9 9 23.81	2.0526	20 0 11.3	6.705
21	7 30 35.67	2.1432	23 27 6.6	1.950	21	9 11 26.90	2.0503	19 53 26.3	6.795
22	7 32 44.23	2.1420	23 25 6.3	2.060	22	9 13 29.85	2.0480	19 46 35.9	6.885
23	7 34 52.71	2.1407	N.23 22 59.4	2.169	23	9 15 32.66	2.0457	N.19 39 40.1	6.974
	TUESDAY 10.					**THURSDAY 12.**			
0	7 37 1.12	2.1394	N.23 20 46.0	2.277	0	9 17 35.34	2.0435	N.19 32 39.0	7.062
1	7 39 9.44	2.1380	23 18 26.1	2.386	1	9 19 37.88	2.0412	19 25 32.6	7.151
2	7 41 17.68	2.1367	23 15 59.7	2.495	2	9 21 40.28	2.0389	19 18 20.9	7.239
3	7 43 25.84	2.1352	23 13 26.7	2.603	3	9 23 42.55	2.0367	19 11 3.9	7.327
4	7 45 33.91	2.1337	23 10 47.3	2.711	4	9 25 44.68	2.0344	19 3 41.7	7.413
5	7 47 41.88	2.1321	23 8 1.4	2.818	5	9 27 46.67	2.0321	18 56 14.3	7.499
6	7 49 49.76	2.1306	23 5 9.1	2.925	6	9 29 48.53	2.0299	18 48 41.8	7.584
7	7 51 57.55	2.1290	23 2 10.4	3.032	7	9 31 50.26	2.0277	18 41 4.2	7.669
8	7 54 5.24	2.1273	22 59 5.3	3.138	8	9 33 51.85	2.0254	18 33 21.5	7.754
9	7 56 12.83	2.1257	22 55 53.8	3.245	9	9 35 53.31	2.0232	18 25 33.7	7.838
10	7 58 20.32	2.1240	22 52 35.9	3.352	10	9 37 54.64	2.0211	18 17 40.9	7.921
11	8 0 27.71	2.1223	22 49 11.6	3.458	11	9 39 55.84	2.0188	18 9 43.1	8.004
12	8 2 35.00	2.1206	22 45 41.0	3.563	12	9 41 56.90	2.0166	18 1 40.4	8.087
13	8 4 42.18	2.1188	22 42 4.1	3.667	13	9 43 57.83	2.0145	17 53 32.7	8.168
14	8 6 49.25	2.1169	22 38 21.0	3.771	14	9 45 58.64	2.0124	17 45 20.2	8.249
15	8 8 56.21	2.1150	22 34 31.6	3.875	15	9 47 59.32	2.0103	17 37 2.8	8.330
16	8 11 3.05	2.1131	22 30 36.0	3.978	16	9 49 59.87	2.0082	17 28 40.6	8.410
17	8 13 9.78	2.1112	22 26 34.2	4.082	17	9 52 0.30	2.0062	17 20 13.6	8.490
18	8 15 16.40	2.1093	22 22 26.2	4.185	18	9 54 0.61	2.0042	17 11 41.8	8.569
19	8 17 22.90	2.1073	22 18 12.0	4.287	19	9 56 0.80	2.0021	17 3 5.3	8.647
20	8 19 29.28	2.1053	22 13 51.7	4.389	20	9 58 0.86	2.0000	16 54 24.1	8.725
21	8 21 35.54	2.1033	22 9 25.3	4.491	21	10 0 0.80	1.9981	16 45 38.3	8.802
22	8 23 41.68	2.1012	22 4 52.8	4.592	22	10 2 0.63	1.9962	16 36 47.8	8.879
23	8 25 47.69	2.0992	22 0 14.2	4.693	23	10 4 0.34	1.9942	16 27 52.8	8.955
24	8 27 53.58	2.0971	N.21 55 29.6	4.793	24	10 5 59.93	1.9923	N.16 18 53.2	9.031

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

FRIDAY 13.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	10 5 59.93	1.9923	N.16 18 53.2	9.031
1	10 7 59.41	1.9904	16 9 49.1	9.106
2	10 9 58.78	1.9886	16 0 40.5	9.181
3	10 11 58.04	1.9867	15 51 27.4	9.255
4	10 13 57.19	1.9849	15 42 9.9	9.328
5	10 15 56.23	1.9832	15 32 48.1	9.400
6	10 17 55.17	1.9814	15 23 21.9	9.472
7	10 19 54.00	1.9797	15 13 51.4	9.544
8	10 21 52.74	1.9781	15 4 16.6	9.615
9	10 23 51.38	1.9765	14 54 37.6	9.685
10	10 25 49.92	1.9749	14 44 54.4	9.755
11	10 27 48.37	1.9734	14 35 7.0	9.825
12	10 29 46.73	1.9719	14 25 15.4	9.893
13	10 31 45.00	1.9704	14 15 19.8	9.961
14	10 33 43.18	1.9689	14 5 20.1	10.029
15	10 35 41.27	1.9675	13 55 16.3	10.096
16	10 37 39.28	1.9662	13 45 8.5	10.162
17	10 39 37.21	1.9648	13 34 56.8	10.228
18	10 41 35.05	1.9634	13 24 41.1	10.294
19	10 43 32.82	1.9622	13 14 21.5	10.358
20	10 45 30.52	1.9611	13 3 58.1	10.422
21	10 47 28.15	1.9599	12 53 30.8	10.486
22	10 49 25.71	1.9588	12 42 59.7	10.549
23	10 51 23.20	1.9577	N.12 32 24.9	10.611

SATURDAY 14.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	10 53 20.63	1.9567	N.12 21 46.4	10.672
1	10 55 18.00	1.9557	12 11 4.2	10.734
2	10 57 15.31	1.9548	12 0 18.3	10.795
3	10 59 12.57	1.9539	11 49 28.8	10.855
4	11 1 9.78	1.9531	11 38 35.7	10.914
5	11 3 6.94	1.9523	11 27 39.1	10.973
6	11 5 4.05	1.9515	11 16 39.0	11.031
7	11 7 1.12	1.9508	11 5 35.4	11.089
8	11 8 58.15	1.9502	10 54 28.4	11.146
9	11 10 55.14	1.9496	10 43 17.9	11.202
10	11 12 52.10	1.9491	10 32 4.1	11.257
11	11 14 49.03	1.9486	10 20 47.0	11.312
12	11 16 45.93	1.9481	10 9 26.6	11.367
13	11 18 42.80	1.9478	9 58 2.9	11.421
14	11 20 39.66	1.9475	9 46 36.0	11.474
15	11 22 36.50	1.9472	9 35 6.0	11.527
16	11 24 33.32	1.9469	9 23 32.8	11.579
17	11 26 30.13	1.9468	9 11 56.5	11.630
18	11 28 26.93	1.9467	9 0 17.2	11.681
19	11 30 23.73	1.9466	8 48 34.8	11.732
20	11 32 20.52	1.9466	8 36 49.4	11.781
21	11 34 17.32	1.9467	8 25 1.1	11.829
22	11 36 14.12	1.9468	8 13 9.9	11.878
23	11 38 10.93	1.9470	8 1 15.8	11.926
24	11 40 7.76	1.9472	N. 7 49 18.8	11.972

SUNDAY 15.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	11 40 7.76	1.9472	N. 7 49 18.8	11.972
1	11 42 4.60	1.9475	7 37 19.1	12.018
2	11 44 1.46	1.9479	7 25 16.6	12.064
3	11 45 58.35	1.9483	7 13 11.4	12.109
4	11 47 55.26	1.9487	7 1 3.5	12.153
5	11 49 52.20	1.9493	6 48 53.0	12.197
6	11 51 49.18	1.9500	6 36 39.9	12.240
7	11 53 46.20	1.9506	6 24 24.2	12.282
8	11 55 43.26	1.9513	6 12 6.0	12.323
9	11 57 40.36	1.9521	5 59 45.4	12.364
10	11 59 37.51	1.9530	5 47 22.3	12.405
11	12 1 34.72	1.9539	5 34 56.8	12.444
12	12 3 31.98	1.9548	5 22 29.0	12.483
13	12 5 29.30	1.9559	5 9 58.9	12.521
14	12 7 26.69	1.9571	4 57 26.5	12.558
15	12 9 24.16	1.9584	4 44 51.9	12.595
16	12 11 21.70	1.9596	4 32 15.1	12.631
17	12 13 19.31	1.9608	4 19 36.2	12.666
18	12 15 17.00	1.9622	4 6 55.2	12.700
19	12 17 14.78	1.9637	3 54 12.2	12.733
20	12 19 12.65	1.9652	3 41 27.2	12.766
21	12 21 10.61	1.9668	3 28 40.2	12.799
22	12 23 8.67	1.9685	3 15 51.3	12.831
23	12 25 6.83	1.9703	N. 3 3 0.5	12.862

MONDAY 16.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	12 27 5.10	1.9721	N. 2 50 7.9	12.892
1	12 29 3.48	1.9740	2 37 13.5	12.921
2	12 31 1.98	1.9759	2 24 17.4	12.948
3	12 33 0.59	1.9778	2 11 19.7	12.975
4	12 34 59.32	1.9799	1 58 20.4	13.002
5	12 36 58.18	1.9822	1 45 19.5	13.027
6	12 38 57.18	1.9845	1 32 17.1	13.052
7	12 40 56.32	1.9867	1 19 13.2	13.077
8	12 42 55.59	1.9890	1 6 7.9	13.100
9	12 44 55.00	1.9914	0 53 1.2	13.122
10	12 46 54.56	1.9940	0 39 53.2	13.144
11	12 48 54.28	1.9967	0 26 43.9	13.164
12	12 50 54.16	1.9993	0 13 33.5	13.183
13	12 52 54.20	2.0021	N. 0 0 21.9	13.202
14	12 54 54.41	2.0049	S. 0 12 50.8	13.221
15	12 56 54.78	2.0077	0 26 4.6	13.238
16	12 58 55.33	2.0107	0 39 19.4	13.254
17	13 0 56.07	2.0138	0 52 35.1	13.269
18	13 2 56.99	2.0169	1 5 51.7	13.283
19	13 4 58.10	2.0201	1 19 9.1	13.297
20	13 6 59.40	2.0233	1 32 27.3	13.309
21	13 9 0.90	2.0267	1 45 46.2	13.320
22	13 11 2.61	2.0301	1 59 5.7	13.330
23	13 13 4.52	2.0336	2 12 25.8	13.340
24	13 15 6.64	2.0372	S. 2 25 46.5	13.349

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

TUESDAY 17.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	13 15 6.64	2.0372	S. 2 25 46.5	13.349
1	13 17 8.98	2.0408	2 39 7.7	13.356
2	13 19 11.54	2.0445	2 52 29.2	13.361
3	13 21 14.32	2.0483	3 5 51.0	13.366
4	13 23 17.33	2.0522	3 19 13.1	13.371
5	13 25 20.58	2.0562	3 32 35.5	13.374
6	13 27 24.07	2.0602	3 45 58.0	13.376
7	13 29 27.80	2.0643	3 59 20.6	13.377
8	13 31 31.78	2.0684	4 12 43.2	13.376
9	13 33 36.01	2.0727	4 26 5.7	13.374
10	13 35 40.50	2.0770	4 39 28.1	13.372
11	13 37 45.25	2.0814	4 52 50.3	13.368
12	13 39 50.27	2.0860	5 6 12.3	13.363
13	13 41 55.56	2.0905	5 19 33.9	13.357
14	13 44 1.13	2.0951	5 32 55.1	13.350
15	13 46 6.97	2.0997	5 46 15.9	13.342
16	13 48 13.09	2.1045	5 59 36.1	13.332
17	13 50 19.51	2.1094	6 12 55.7	13.320
18	13 52 26.22	2.1143	6 26 14.5	13.307
19	13 54 33.23	2.1193	6 39 32.5	13.294
20	13 56 40.54	2.1243	6 52 49.7	13.280
21	13 58 48.15	2.1294	7 6 6.1	13.264
22	14 0 56.07	2.1347	7 19 21.4	13.246
23	14 3 4.31	2.1401	S. 7 32 35.6	13.227

WEDNESDAY 18.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	14 5 12.88	2.1455	S. 7 45 48.6	13.207
1	14 7 21.77	2.1509	7 59 0.4	13.186
2	14 9 30.99	2.1563	8 12 10.8	13.162
3	14 11 40.53	2.1619	8 25 19.8	13.137
4	14 13 50.41	2.1676	8 38 27.3	13.112
5	14 16 0.64	2.1733	8 51 33.2	13.085
6	14 18 11.21	2.1791	9 4 37.5	13.057
7	14 20 22.13	2.1849	9 17 40.0	13.026
8	14 22 33.40	2.1908	9 30 40.6	12.994
9	14 24 45.03	2.1968	9 43 39.3	12.962
10	14 26 57.02	2.2029	9 56 36.0	12.927
11	14 29 9.38	2.2090	10 9 30.5	12.890
12	14 31 22.10	2.2151	10 22 22.8	12.853
13	14 33 35.19	2.2213	10 35 12.8	12.814
14	14 35 48.66	2.2277	10 48 0.5	12.773
15	14 38 2.52	2.2342	11 0 45.6	12.730
16	14 40 16.76	2.2406	11 13 28.1	12.687
17	14 42 31.39	2.2470	11 26 8.0	12.642
18	14 44 46.40	2.2535	11 38 45.1	12.594
19	14 47 1.81	2.2601	11 51 19.3	12.545
20	14 49 17.62	2.2667	12 3 50.5	12.496
21	14 51 33.82	2.2734	12 16 18.7	12.443
22	14 53 50.43	2.2802	12 28 43.7	12.389
23	14 56 7.45	2.2871	12 41 5.4	12.333
24	14 58 24.88	2.2940	S. 12 53 23.7	12.276

THURSDAY 19.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	14 58 24.88	2.2940	S. 12 53 23.7	12.276
1	15 0 42.73	2.3009	13 5 38.5	12.217
2	15 3 0.99	2.3078	13 17 49.7	12.157
3	15 5 19.66	2.3147	13 29 57.3	12.095
4	15 7 38.75	2.3217	13 42 1.1	12.030
5	15 9 58.27	2.3288	13 54 0.9	11.963
6	15 12 18.21	2.3358	14 5 56.7	11.896
7	15 14 38.57	2.3430	14 17 48.4	11.827
8	15 16 59.37	2.3502	14 29 35.9	11.755
9	15 19 20.60	2.3575	14 41 19.0	11.682
10	15 21 42.27	2.3647	14 52 57.7	11.607
11	15 24 4.37	2.3720	15 4 31.8	11.530
12	15 26 26.91	2.3793	15 16 1.3	11.452
13	15 28 49.89	2.3867	15 27 26.0	11.371
14	15 31 13.31	2.3940	15 38 45.8	11.288
15	15 33 37.17	2.4013	15 50 0.6	11.203
16	15 36 1.47	2.4087	16 1 10.2	11.117
17	15 38 26.22	2.4162	16 12 14.6	11.029
18	15 40 51.41	2.4236	16 23 13.7	10.939
19	15 43 17.05	2.4310	16 34 7.3	10.847
20	15 45 43.13	2.4384	16 44 55.3	10.753
21	15 48 9.66	2.4458	16 55 37.7	10.658
22	15 50 36.63	2.4532	17 6 14.3	10.560
23	15 53 4.05	2.4607	S. 17 16 44.9	10.459

FRIDAY 20.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	15 55 31.92	2.4682	S. 17 27 9.4	10.358
1	15 58 0.23	2.4756	17 37 27.8	10.255
2	16 0 28.99	2.4830	17 47 40.0	10.150
3	16 2 58.19	2.4904	17 57 45.8	10.042
4	16 5 27.83	2.4978	18 7 45.1	9.933
5	16 7 57.92	2.5052	18 17 37.8	9.822
6	16 10 28.45	2.5125	18 27 23.8	9.709
7	16 12 59.42	2.5198	18 37 2.9	9.593
8	16 15 30.83	2.5271	18 46 35.0	9.477
9	16 18 2.67	2.5343	18 56 0.1	9.358
10	16 20 34.95	2.5416	19 5 18.0	9.237
11	16 23 7.66	2.5487	19 14 28.6	9.115
12	16 25 40.79	2.5558	19 23 31.8	8.991
13	16 28 14.35	2.5629	19 32 27.5	8.864
14	16 30 48.34	2.5700	19 41 15.5	8.736
15	16 33 22.75	2.5769	19 49 55.8	8.606
16	16 35 57.57	2.5838	19 58 28.2	8.474
17	16 38 32.81	2.5906	20 6 52.7	8.340
18	16 41 8.45	2.5974	20 15 9.0	8.204
19	16 43 44.50	2.6042	20 23 17.1	8.067
20	16 46 20.95	2.6108	20 31 17.0	7.928
21	16 48 57.79	2.6174	20 39 8.5	7.787
22	16 51 35.03	2.6239	20 46 51.5	7.645
23	16 54 12.66	2.6302	20 54 25.9	7.500
24	16 56 50.66	2.6365	S. 21 1 51.5	7.353

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	SATURDAY 21.					**MONDAY 23.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	16 56 50.66	2.6365	S.21 1 51.5	7.353	0	19 8 11.41	2.7735	S.23 41 29.4	1.016
1	16 59 29.04	2.6427	21 9 8.3	7.206	1	19 10 57.78	2.7720	23 40 22.9	1.201
2	17 2 7.79	2.6489	21 16 16.2	7.057	2	19 13 44.05	2.7703	23 39 5.3	1.385
3	17 4 46.91	2.6550	21 23 15.1	6.906	3	19 16 30.22	2.7685	23 37 36.7	1.569
4	17 7 26.39	2.6609	21 30 4.9	6.753	4	19 19 16.27	2.7665	23 35 57.0	1.752
5	17 10 6.22	2.6667	21 36 45.4	6.598	5	19 22 2.20	2.7643	23 34 6.4	1.935
6	17 12 46.39	2.6724	21 43 16.6	6.442	6	19 24 47.99	2.7619	23 32 4.8	2.117
7	17 15 26.90	2.6780	21 49 38.4	6.284	7	19 27 33.63	2.7593	23 29 52.3	2.299
8	17 18 7.75	2.6835	21 55 50.7	6.126	8	19 30 19.11	2.7566	23 27 28.9	2.481
9	17 20 48.92	2.6888	22 1 53.5	5.966	9	19 33 4.43	2.7538	23 24 54.6	2.662
10	17 23 30.40	2.6940	22 7 46.7	5.804	10	19 35 49.57	2.7508	23 22 9.5	2.841
11	17 26 12.20	2.6991	22 13 30.0	5.639	11	19 38 34.52	2.7475	23 19 13.7	3.019
12	17 28 54.30	2.7041	22 19 3.4	5.474	12	19 41 19.27	2.7441	23 16 7.2	3.197
13	17 31 36.69	2.7089	22 24 26.9	5.309	13	19 44 3.81	2.7405	23 12 50.1	3.373
14	17 34 19.37	2.7137	22 29 40.5	5.142	14	19 46 48.13	2.7368	23 9 22.4	3.550
15	17 37 2.33	2.7183	22 34 44.0	4.974	15	19 49 32.23	2.7330	23 5 44.1	3.725
16	17 39 45.56	2.7227	22 39 37.4	4.804	16	19 52 16.09	2.7289	23 1 55.4	3.898
17	17 42 29.05	2.7269	22 44 20.5	4.633	17	19 54 59.70	2.7247	22 57 56.3	4.071
18	17 45 12.79	2.7310	22 48 53.3	4.461	18	19 57 43.05	2.7204	22 53 46.9	4.242
19	17 47 56.77	2.7349	22 53 15.8	4.288	19	20 0 26.14	2.7159	22 49 27.2	4.413
20	17 50 40.98	2.7387	22 57 27.8	4.113	20	20 3 8.96	2.7112	22 44 57.3	4.582
21	17 53 25.42	2.7424	23 1 29.3	3.938	21	20 5 51.49	2.7065	22 40 17.3	4.750
22	17 56 10.07	2.7459	23 5 20.3	3.762	22	20 8 33.74	2.7017	22 35 27.3	4.918
23	17 58 54.92	2.7492	S.23 9 0.7	3.584	23	20 11 15.69	2.6966	S.22 30 27.2	5.084
	SUNDAY 22.					**TUESDAY 24.**			
0	18 1 39.97	2.7523	S.23 12 30.4	3.406	0	20 13 57.33	2.6914	S.22 25 17.2	5.248
1	18 4 25.20	2.7553	23 15 49.4	3.227	1	20 16 38.65	2.6861	22 19 57.4	5.411
2	18 7 10.60	2.7581	23 18 57.6	3.047	2	20 19 19.66	2.6807	22 14 27.9	5.572
3	18 9 56.17	2.7607	23 21 55.0	2.867	3	20 22 0.34	2.6752	22 8 48.7	5.732
4	18 12 41.89	2.7632	23 24 41.6	2.685	4	20 24 40.68	2.6695	22 3 0.0	5.891
5	18 15 27.75	2.7655	23 27 17.2	2.503	5	20 27 20.68	2.6637	21 57 1.8	6.048
6	18 18 13.75	2.7676	23 29 41.9	2.320	6	20 30 0.33	2.6578	21 50 54.2	6.204
7	18 20 59.87	2.7695	23 31 55.6	2.137	7	20 32 39.62	2.6518	21 44 37.3	6.358
8	18 23 46.09	2.7712	23 33 58.3	1.953	8	20 35 18.55	2.6458	21 38 11.2	6.510
9	18 26 32.41	2.7727	23 35 50.0	1.769	9	20 37 57.12	2.6396	21 31 36.1	6.660
10	18 29 18.82	2.7741	23 37 30.6	1.584	10	20 40 35.31	2.6333	21 24 52.0	6.810
11	18 32 5.30	2.7752	23 39 0.1	1.399	11	20 43 13.12	2.6270	21 17 58.9	6.958
12	18 34 51.85	2.7762	23 40 18.5	1.214	12	20 45 50.55	2.6206	21 10 57.0	7.104
13	18 37 38.45	2.7771	23 41 25.8	1.028	13	20 48 27.59	2.6140	21 3 46.4	7.248
14	18 40 25.10	2.7777	23 42 21.9	0.842	14	20 51 4.23	2.6073	20 56 27.2	7.391
15	18 43 11.78	2.7782	23 43 6.9	0.656	15	20 53 40.47	2.6007	20 48 59.5	7.532
16	18 45 58.48	2.7784	23 43 40.7	0.470	16	20 56 16.31	2.5939	20 41 23.4	7.671
17	18 48 45.19	2.7784	23 44 3.3	0.284	17	20 58 51.74	2.5871	20 33 39.0	7.808
18	18 51 31.89	2.7782	23 44 14.8	− 0.098	18	21 1 26.76	2.5802	20 25 46.4	7.944
19	18 54 18.58	2.7779	23 44 15.1	+ 0.088	19	21 4 1.36	2.5733	20 17 45.7	8.078
20	18 57 5.25	2.7774	23 44 4.2	0.274	20	21 6 35.55	2.5663	20 9 37.0	8.211
21	18 59 51.87	2.7766	23 43 42.2	0.459	21	21 9 9.32	2.5592	20 1 20.4	8.342
22	19 2 38.44	2.7757	23 43 9.1	0.645	22	21 11 42.66	2.5522	19 52 56.0	8.470
23	19 5 24.96	2.7747	23 42 24.8	0.831	23	21 14 15.58	2.5451	19 44 24.0	8.597
24	19 8 11.41	2.7735	S.23 41 29.4	1.016	24	21 16 48.07	2.5379	S.19 35 44.4	8.722

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	WEDNESDAY 25.					**FRIDAY 27.**			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	21 16 48.07	2.5379	S. 19 35 44.4	8.722	0	23 10 15.91	2.2003	S. 10 47 27.2	12.621
1	21 19 20.12	2.5306	19 26 57.4	8.845	1	23 12 27.75	2.1943	10 34 48.7	12.662
2	21 21 51.74	2.5233	19 18 3.0	8.967	2	23 14 39.23	2.1884	10 22 7.7	12.702
3	21 24 22.92	2.5160	19 9 1.4	9.086	3	23 16 50.36	2.1826	10 9 24.4	12.740
4	21 26 53.66	2.5087	18 59 52.7	9.203	4	23 19 1.14	2.1768	9 56 38.9	12.776
5	21 29 23.96	2.5013	18 50 37.0	9.320	5	23 21 11.58	2.1711	9 43 51.3	12.811
6	21 31 53.81	2.4939	18 41 14.3	9.434	6	23 23 21.67	2.1654	9 31 1.6	12.844
7	21 34 23.22	2.4865	18 31 44.9	9.546	7	23 25 31.42	2.1598	9 18 10.0	12.876
8	21 36 52.19	2.4792	18 22 8.8	9.657	8	23 27 40.85	2.1544	9 5 16.5	12.907
9	21 39 20.72	2.4718	18 12 26.1	9.766	9	23 29 49.95	2.1490	8 52 21.1	12.937
10	21 41 48.80	2.4643	18 2 36.9	9.872	10	23 31 58.73	2.1436	8 39 24.0	12.965
11	21 44 16.44	2.4569	17 52 41.4	9.977	11	23 34 7.18	2.1383	8 26 25.3	12.992
12	21 46 43.63	2.4494	17 42 39.7	10.079	12	23 36 15.32	2.1331	8 13 25.0	13.018
13	21 49 10.37	2.4420	17 32 31.9	10.180	13	23 38 23.15	2.1280	8 0 23.2	13.042
14	21 51 36.67	2.4347	17 22 18.1	10.280	14	23 40 30.68	2.1229	7 47 20.0	13.064
15	21 54 2.53	2.4273	17 11 58.3	10.378	15	23 42 37.90	2.1179	7 34 15.5	13.086
16	21 56 27.94	2.4198	17 1 32.7	10.473	16	23 44 44.83	2.1130	7 21 9.7	13.107
17	21 58 52.90	2.4124	16 51 1.5	10.567	17	23 46 51.46	2.1081	7 8 2.7	13.125
18	22 1 17.42	2.4050	16 40 24.7	10.659	18	23 48 57.80	2.1033	6 54 54.7	13.143
19	22 3 41.50	2.3976	16 29 42.4	10.749	19	23 51 3.86	2.0987	6 41 45.6	13.160
20	22 6 5.14	2.3902	16 18 54.8	10.838	20	23 53 9.64	2.0941	6 28 35.5	13.175
21	22 8 28.33	2.3829	16 8 1.9	10.925	21	23 55 15.15	2.0896	6 15 24.6	13.189
22	22 10 51.08	2.3756	15 57 3.8	11.010	22	23 57 20.39	2.0851	6 2 12.8	13.203
23	22 13 13.40	2.3683	S. 15 46 0.7	11.093	23	23 59 25.36	2.0807	S. 5 49 0.2	13.215
	THURSDAY 26.					**SATURDAY 28.**			
0	22 15 35.28	2.3611	S. 15 34 52.7	11.174	0	0 1 30.07	2.0763	S. 5 35 47.0	13.225
1	22 17 56.73	2.3539	15 23 39.8	11.254	1	0 3 34.52	2.0722	5 22 33.2	13.235
2	22 20 17.75	2.3467	15 12 22.2	11.331	2	0 5 38.73	2.0681	5 9 18.8	13.244
3	22 22 38.33	2.3395	15 1 0.1	11.406	3	0 7 42.69	2.0640	4 56 3.9	13.251
4	22 24 58.49	2.3324	14 49 33.5	11.481	4	0 9 46.41	2.0600	4 42 48.7	13.257
5	22 27 18.22	2.3253	14 38 2.4	11.554	5	0 11 49.89	2.0561	4 29 33.1	13.263
6	22 29 37.52	2.3182	14 26 27.0	11.626	6	0 13 53.14	2.0523	4 16 17.2	13.267
7	22 31 56.40	2.3112	14 14 47.3	11.695	7	0 15 56.16	2.0485	4 3 1.1	13.269
8	22 34 14.87	2.3043	14 3 3.6	11.761	8	0 17 58.96	2.0447	3 49 44.9	13.271
9	22 36 32.92	2.2974	13 51 16.0	11.826	9	0 20 1.53	2.0411	3 36 28.6	13.272
10	22 38 50.56	2.2906	13 39 24.5	11.891	10	0 22 3.89	2.0376	3 23 12.2	13.272
11	22 41 7.79	2.2838	13 27 29.1	11.954	11	0 24 6.04	2.0342	3 9 55.9	13.271
12	22 43 24.61	2.2770	13 15 30.0	12.015	12	0 26 7.99	2.0308	2 56 39.7	13.269
13	22 45 41.03	2.2703	13 3 27.3	12.074	13	0 28 9.74	2.0275	2 43 23.6	13.266
14	22 47 57.05	2.2636	12 51 21.1	12.132	14	0 30 11.29	2.0242	2 30 7.8	13.261
15	22 50 12.66	2.2569	12 39 11.5	12.188	15	0 32 12.64	2.0210	2 16 52.3	13.256
16	22 52 27.88	2.2504	12 26 58.6	12.242	16	0 34 13.81	2.0180	2 3 37.1	13.250
17	22 54 42.71	2.2440	12 14 42.5	12.295	17	0 36 14.80	2.0150	1 50 22.3	13.242
18	22 56 57.16	2.2376	12 2 23.2	12.347	18	0 38 15.61	2.0121	1 37 8.0	13.234
19	22 59 11.23	2.2312	11 50 0.9	12.396	19	0 40 16.24	2.0092	1 23 54.2	13.225
20	23 1 24.91	2.2248	11 37 35.7	12.444	20	0 42 16.71	2.0064	1 10 41.0	13.215
21	23 3 38.21	2.2186	11 25 7.6	12.492	21	0 44 17.01	2.0037	0 57 28.4	13.204
22	23 5 51.14	2.2125	11 12 36.7	12.537	22	0 46 17.15	2.0011	0 44 16.5	13.192
23	23 8 3.71	2.2064	11 0 3.2	12.579	23	0 48 17.14	1.9986	0 31 5.3	13.180
24	23 10 15.91	2.2003	S. 10 47 27.2	12.621	24	0 50 16.98	1.9961	S. 0 17 54.9	13.166

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

SUNDAY 29.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	0 50 16.98	1.9961	S. 0 17 54.9	13.166
1	0 52 16.67	1.9937	S. 0 4 45.4	13.151
2	0 54 16.22	1.9913	N. 0 8 23.2	13.136
3	0 56 15.63	1.9891	0 21 30.9	13.119
4	0 58 14.91	1.9869	0 34 37.5	13.101
5	1 0 14.06	1.9848	0 47 43.0	13.083
6	1 2 13.09	1.9828	1 0 47.5	13.065
7	1 4 12.00	1.9808	1 13 50.8	13.044
8	1 6 10.79	1.9788	1 26 52.8	13.023
9	1 8 9.46	1.9770	1 39 53.6	13.002
10	1 10 8.03	1.9753	1 52 53.1	12.980
11	1 12 6.50	1.9736	2 5 51.2	12.957
12	1 14 4.87	1.9720	2 18 47.9	12.932
13	1 16 3.14	1.9705	2 31 43.1	12.907
14	1 18 1.33	1.9691	2 44 36.8	12.882
15	1 19 59.43	1.9677	2 57 28.9	12.855
16	1 21 57.45	1.9663	3 10 19.4	12.827
17	1 23 55.39	1.9650	3 23 8.2	12.799
18	1 25 53.25	1.9638	3 35 55.3	12.770
19	1 27 51.05	1.9627	3 48 40.6	12.741
20	1 29 48.78	1.9617	4 1 24.2	12.711
21	1 31 46.45	1.9607	4 14 5.9	12.679
22	1 33 44.06	1.9598	4 26 45.7	12.647
23	1 35 41.62	1.9589	N. 4 39 23.6	12.615

MONDAY 30.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	1 37 39.13	1.9581	N. 4 51 59.5	12.582
1	1 39 36.59	1.9573	5 4 33.4	12.547
2	1 41 34.01	1.9567	5 17 5.1	12.511
3	1 43 31.40	1.9562	5 29 34.7	12.475
4	1 45 28.75	1.9556	5 42 2.1	12.439
5	1 47 26.07	1.9551	5 54 27.3	12.402
6	1 49 23.36	1.9547	6 6 50.3	12.364
7	1 51 20.63	1.9543	6 19 11.0	12.325
8	1 53 17.88	1.9540	6 31 29.3	12.285
9	1 55 15.11	1.9538	6 43 45.2	12.245
10	1 57 12.33	1.9537	6 55 58.7	12.204
11	1 59 9.55	1.9536	7 8 9.7	12.162
12	2 1 6.76	1.9535	7 20 18.1	12.119
13	2 3 3.97	1.9535	7 32 24.0	12.076
14	2 5 1.18	1.9535	7 44 27.3	12.032
15	2 6 58.39	1.9536	7 56 27.9	11.988
16	2 8 55.61	1.9538	8 8 25.9	11.943
17	2 10 52.85	1.9541	8 20 21.1	11.897
18	2 12 50.10	1.9544	8 32 13.5	11.850
19	2 14 47.38	1.9548	8 44 3.1	11.802
20	2 16 44.68	1.9552	8 55 49.8	11.755
21	2 18 42.00	1.9556	9 7 33.7	11.707
22	2 20 39.35	1.9561	9 19 14.6	11.657
23	2 22 36.74	1.9567	9 30 52.5	11.606
24	2 24 34.16	1.9573	N. 9 42 27.3	11.555

TUESDAY 31.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
	h m s	s	° ′ ″	″
0	2 24 34.16	1.9573	N. 9 42 27.3	11.555
1	2 26 31.62	1.9580	9 53 59.1	11.504
2	2 28 29.12	1.9587	10 5 27.8	11.452
3	2 30 26.67	1.9595	10 16 53.3	11.399
4	2 32 24.26	1.9603	10 28 15.6	11.345
5	2 34 21.90	1.9612	10 39 34.7	11.291
6	2 36 19.60	1.9622	10 50 50.5	11.236
7	2 38 17.36	1.9631	11 2 3.0	11.180
8	2 40 15.17	1.9640	11 13 12.1	11.124
9	2 42 13.04	1.9651	11 24 17.9	11.067
10	2 44 10.98	1.9662	11 35 20.2	11.009
11	2 46 8.99	1.9673	11 46 19.0	10.951
12	2 48 7.06	1.9685	11 57 14.3	10.892
13	2 50 5.21	1.9698	12 8 6.1	10.832
14	2 52 3.44	1.9711	12 18 54.2	10.772
15	2 54 1.74	1.9724	12 29 38.7	10.711
16	2 56 0.12	1.9737	12 40 19.5	10.649
17	2 57 58.58	1.9751	12 50 56.6	10.587
18	2 59 57.13	1.9765	13 1 29.9	10.524
19	3 1 55.76	1.9780	13 11 59.4	10.460
20	3 3 54.49	1.9796	13 22 25.1	10.396
21	3 5 53.31	1.9811	13 32 46.9	10.331
22	3 7 52.22	1.9827	13 43 4.8	10.265
23	3 9 51.23	1.9843	N.13 53 18.7	10.199

WEDNESDAY, JANUARY 1, 1890.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
0	3 11 50.34	1.9860	N.14 3 28.7	10.133

PHASES OF THE MOON.

		d	h	m
○ Full Moon . . .	Dec.	6	21	52.4
☾ Last Quarter		15	2	58.3
● New Moon		22	0	52.7
☽ First Quarter . . .		28	17	16.5

		d	h
☾ Apogee	Dec.	9	20.4
☾ Perigee		22	13.4

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Sun	W.	111° 54′ 53″	2978	113° 25′ 33″	2991	114° 55′ 57″	3003	116° 26′ 6″	3014
	Jupiter	W.	80 38 16	2698	82 14 58	2710	83 51 24	2722	85 27 35	2733
	α Aquilæ	W.	68 10 42	3449	69 32 3	3443	70 53 31	3438	72 15 5	3435
	Fomalhaut	W.	32 29 50	3318	33 53 41	3272	35 18 25	3234	36 43 54	3202
	Aldebaran	E.	66 22 9	2635	64 44 2	2646	63 6 10	2658	61 28 34	2669
2	Sun	W.	123 53 16	3071	125 22 1	3082	126 50 32	3093	128 18 50	3103
	Jupiter	W.	93 24 56	2786	94 59 42	2796	96 34 15	2806	98 8 35	2815
	α Aquilæ	W.	79 3 22	3436	80 24 58	3438	81 46 31	3442	83 8 0	3447
	Fomalhaut	W.	43 59 5	3104	45 27 10	3092	46 55 29	3083	48 23 59	3075
	Aldebaran	E.	53 24 15	2723	51 48 6	2734	50 12 11	2744	48 36 29	2754
	Pollux	E.	97 37 19	2729	96 1 18	2738	94 25 29	2748	92 49 53	2758
3	Jupiter	W.	105 57 11	2862	107 30 18	2871	109 3 14	2880	110 35 59	2888
	α Aquilæ	W.	89 53 44	3483	91 14 27	3493	92 34 59	3503	93 55 20	3514
	Fomalhaut	W.	55 48 14	3057	57 17 16	3056	58 46 19	3057	60 15 21	3057
	α Pegasi	W.	42 26 49	3792	43 42 0	3743	44 58 2	3701	46 14 48	3663
	Aldebaran	E.	40 41 21	2804	39 6 58	2814	37 32 48	2824	35 58 51	2833
	Pollux	E.	84 55 0	2804	83 20 37	2812	81 46 25	2821	80 12 24	2829
4	Fomalhaut	W.	67 40 13	3067	69 9 3	3070	70 37 49	3073	72 6 31	3077
	α Pegasi	W.	52 47 25	3528	54 7 18	3510	55 27 31	3493	56 48 3	3479
	Aldebaran	E.	28 12 18	2885	26 39 40	2896	25 7 16	2909	23 35 8	2921
	Pollux	E.	72 25 2	2870	70 52 5	2878	69 19 18	2886	67 46 41	2893
	Regulus	E.	108 18 30	2862	106 45 23	2870	105 12 26	2877	103 39 38	2884
5	Fomalhaut	W.	79 28 49	3099	80 57 0	3104	82 25 5	3109	83 53 4	3114
	α Pegasi	W.	63 34 9	3429	64 55 53	3423	66 17 44	3417	67 39 41	3414
	Pollux	E.	60 6 0	2931	58 34 20	2938	57 2 49	2946	55 31 28	2953
	Regulus	E.	95 57 52	2919	94 25 57	2925	92 54 10	2931	91 22 31	2939
	Saturn	E.	101 33 34	2920	100 1 41	2927	98 29 57	2935	96 58 22	2941
6	Fomalhaut	W.	91 11 17	3143	92 38 34	3149	94 5 44	3156	95 32 46	3163
	α Pegasi	W.	74 30 20	3403	75 52 33	3403	77 14 46	3403	78 36 59	3404
	α Arietis	W.	30 56 14	3509	32 16 28	3471	33 37 25	3438	34 58 59	3408
	Pollux	E.	47 56 59	2989	46 26 33	2997	44 56 16	3004	43 26 8	3011
	Regulus	E.	83 46 17	2969	82 15 25	2974	80 44 40	2981	79 14 3	2986
	Saturn	E.	89 22 21	2970	87 51 31	2976	86 20 48	2982	84 50 13	2987
7	Fomalhaut	W.	102 45 56	3198	104 12 8	3204	105 38 12	3212	107 4 7	3220
	α Pegasi	W.	85 27 35	3416	86 49 33	3420	88 11 27	3424	89 33 16	3429
	α Arietis	W.	41 53 36	3315	43 17 30	3303	44 41 38	3293	46 5 58	3283
	Pollux	E.	35 57 50	3052	34 28 41	3060	32 59 43	3069	31 30 56	3079
	Regulus	E.	71 42 40	3013	70 12 43	3018	68 42 53	3023	67 13 9	3028
	Saturn	E.	77 18 55	3014	75 48 59	3018	74 19 9	3023	72 49 25	3028
8	α Arietis	W.	53 9 54	3253	54 35 1	3249	56 0 12	3245	57 25 28	3242
	Aldebaran	W.	20 52 29	3090	22 20 51	3087	23 49 16	3086	25 17 43	3085
	Regulus	E.	59 45 57	3051	58 16 47	3056	56 47 43	3060	55 18 44	3064
	Saturn	E.	65 22 9	3050	63 52 58	3053	62 23 51	3057	60 54 49	3060
	Mars	E.	107 55 9	3267	106 30 19	3271	105 5 34	3275	103 40 53	3278
	Spica	E.	113 43 43	3076	112 15 4	3079	110 46 29	3082	109 17 58	3085

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	**Sun**	W.	117° 56′ 1″	3028	119° 25′ 41″	3039	120° 55′ 6″	3049	122° 24′ 18″	3060
	Jupiter	W.	87 3 32	2744	88 39 14	2754	90 14 42	2765	91 49 56	2775
	α Aquilæ	W.	73 36 42	3433	74 58 21	3431	76 20 2	3431	77 41 43	3433
	Fomalhaut	W.	38 10 1	3175	39 36 40	3153	41 3 46	3133	42 31 16	3117
	Aldebaran	E.	59 51 13	2681	58 14 7	2691	56 37 15	2702	55 0 38	2713
2	**Sun**	W.	129 46 56	3114	131 14 49	3124	132 42 29	3134	134 9 57	3143
	Jupiter	W.	99 42 43	2825	101 16 38	2835	102 50 21	2844	104 23 52	2853
	α Aquilæ	W.	84 29 23	3453	85 50 40	3459	87 11 50	3466	88 32 52	3475
	Fomalhaut	W.	49 52 39	3069	51 21 26	3065	52 50 18	3062	54 19 14	3059
	Aldebaran	E.	47 1 1	2764	45 25 46	2775	43 50 45	2785	42 15 57	2794
	Pollux	E.	91 14 30	2767	89 39 19	2777	88 4 21	2786	86 29 35	2795
3	**Jupiter**	W.	112 8 33	2896	113 40 57	2905	115 13 10	2912	116 45 13	2921
	α Aquilæ	W.	95 15 29	3526	96 35 24	3538	97 55 6	3552	99 14 33	3565
	Fomalhaut	W.	61 44 23	3058	63 13 24	3060	64 42 23	3061	66 11 20	3065
	α Pegasi	W.	47 32 14	3630	48 50 16	3599	50 8 51	3573	51 27 55	3549
	Aldebaran	E.	34 25 6	2843	32 51 34	2853	31 18 15	2864	29 45 10	2874
	Pollux	E.	78 38 34	2838	77 4 55	2846	75 31 27	2854	73 58 9	2862
4	Fomalhaut	W.	73 35 9	3081	75 3 42	3085	76 32 10	3090	78 0 32	3094
	α Pegasi	W.	58 8 51	3466	59 29 53	3454	60 51 8	3445	62 12 34	3437
	Aldebaran	E.	22 3 16	2935	20 31 41	2950	19 0 26	2968	17 29 33	2988
	Pollux	E.	66 14 13	2901	64 41 55	2909	63 9 47	2916	61 37 49	2924
	Regulus	E.	102 6 59	2891	100 34 29	2898	99 2 8	2905	97 29 56	2912
5	Fomalhaut	W.	85 20 56	3119	86 48 42	3125	88 16 21	3131	89 43 53	3138
	α Pegasi	W.	69 1 42	3410	70 23 47	3407	71 45 56	3405	73 8 7	3403
	Pollux	E.	54 0 16	2960	52 29 13	2967	50 58 19	2974	49 27 34	2982
	Regulus	E.	89 51 1	2945	88 19 39	2950	86 48 24	2957	85 17 17	2962
	Saturn	E.	95 26 55	2946	93 55 35	2953	92 24 23	2958	90 53 18	2965
6	Fomalhaut	W.	96 59 40	3168	98 26 27	3176	99 53 5	3183	101 19 35	3190
	α Pegasi	W.	79 59 11	3406	81 21 21	3408	82 43 29	3410	84 5 34	3414
	α Arietis	W.	36 21 6	3384	37 43 41	3363	39 6 40	3345	40 29 59	3330
	Pollux	E.	41 56 9	3019	40 26 20	3026	38 56 40	3034	37 27 10	3043
	Regulus	E.	77 43 33	2992	76 13 10	2997	74 42 53	3002	73 12 43	3008
	Saturn	E.	83 19 44	2993	81 49 22	2997	80 19 6	3003	78 48 57	3009
7	Fomalhaut	W.	108 29 52	3228	109 55 28	3236	111 20 54	3245	112 46 10	3254
	α Pegasi	W.	90 55 0	3434	92 16 38	3439	93 38 10	3445	94 59 36	3450
	α Arietis	W.	47 30 29	3276	48 55 9	3269	50 19 57	3263	51 44 52	3257
	Pollux	E.	30 2 21	3090	28 33 59	3101	27 5 51	3114	25 37 58	3127
	Regulus	E.	65 43 31	3033	64 13 59	3038	62 44 33	3042	61 15 12	3047
	Saturn	E.	71 19 47	3032	69 50 14	3037	68 20 47	3041	66 51 25	3046
8	α Arietis	W.	58 50 47	3240	60 16 9	3237	61 41 34	3236	63 7 1	3233
	Aldebaran	W.	26 46 11	3085	28 14 39	3085	29 43 7	3086	31 11 34	3086
	Regulus	E.	53 49 50	3068	52 21 1	3072	50 52 17	3075	49 23 37	3078
	Saturn	E.	59 25 51	3065	57 56 58	3068	56 28 9	3071	54 59 24	3074
	Mars	E.	102 16 16	3282	100 51 43	3285	99 27 14	3288	98 2 48	3290
	Spica	E.	107 49 30	3087	106 21 5	3091	104 52 44	3093	103 24 26	3096

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
9	α Arietis	W.	64° 32′ 31″	3231	65° 58′ 3″	3231	67° 23′ 36″	3230	68° 49′ 10″	3228
	Aldebaran	W.	32 40 1	3087	34 8 27	3087	35 36 52	3087	37 5 17	3088
	Regulus	E.	47 55 1	3082	46 26 30	3085	44 58 2	3088	43 29 38	3091
	SATURN	E.	53 30 43	3077	52 2 5	3080	50 33 31	3082	49 5 0	3084
	MARS	E.	96 38 25	3293	95 14 5	3295	93 49 48	3298	92 25 34	3300
	Spica	E.	101 56 11	3097	100 27 58	3100	98 59 48	3101	97 31 40	3103
10	Aldebaran	W.	44 27 10	3090	45 55 32	3090	47 23 54	3089	48 52 17	3089
	Regulus	E.	36 8 34	3106	34 40 32	3109	33 12 33	3112	31 44 38	3114
	SATURN	E.	41 43 2	3093	40 14 44	3095	38 46 28	3096	37 18 14	3098
	MARS	E.	85 24 52	3306	84 0 47	3306	82 36 43	3306	81 12 39	3306
	Spica	E.	90 11 28	3109	88 43 29	3110	87 15 31	3110	85 47 33	3110
11	Aldebaran	W.	56 14 28	3082	57 43 0	3079	59 11 35	3077	60 40 13	3074
	SATURN	E.	29 57 21	3101	28 29 13	3101	27 1 5	3102	25 32 58	3104
	MARS	E.	74 12 12	3301	72 48 2	3300	71 23 50	3298	69 59 36	3295
	Spica	E.	78 27 39	3106	76 59 37	3105	75 31 33	3103	74 3 27	3101
	SUN	E.	135 40 23	3463	134 19 18	3461	132 58 10	3458	131 36 59	3455
12	Aldebaran	W.	68 4 24	3054	69 33 30	3049	71 2 42	3044	72 32 0	3039
	Pollux	W.	24 11 53	3140	25 39 14	3125	27 6 53	3112	28 34 48	3099
	MARS	E.	62 57 29	3276	61 32 50	3271	60 8 5	3266	58 43 14	3260
	Spica	E.	66 42 11	3086	65 13 44	3082	63 45 12	3078	62 16 35	3073
	SUN	E.	124 50 6	3434	123 28 28	3430	122 6 45	3423	120 44 55	3417
13	Aldebaran	W.	80 0 28	3003	81 30 37	2996	83 0 55	2987	84 31 24	2978
	Pollux	W.	35 58 2	3043	37 27 22	3031	38 56 56	3020	40 26 44	3009
	MARS	E.	51 37 10	3226	50 11 32	3218	48 45 44	3210	47 19 47	3202
	Spica	E.	54 52 2	3047	53 22 47	3041	51 53 25	3034	50 23 55	3028
	SUN	E.	113 53 49	3379	112 31 9	3371	111 8 19	3361	109 45 18	3351
14	Aldebaran	W.	92 6 50	2927	93 38 35	2916	95 10 34	2904	96 42 48	2891
	Pollux	W.	47 59 21	2949	49 30 38	2936	51 2 11	2923	52 34 1	2910
	MARS	E.	40 7 18	3153	38 40 13	3143	37 12 55	3131	35 45 23	3119
	Spica	E.	42 54 20	2994	41 24 0	2987	39 53 31	2980	38 22 53	2973
	SUN	E.	102 47 14	3295	101 22 57	3283	99 58 26	3270	98 33 39	3257
15	Pollux	W.	60 17 33	2838	61 51 11	2823	63 25 9	2807	64 59 28	2792
	Regulus	W.	24 27 47	2873	26 0 41	2859	27 34 2	2831	29 7 49	2812
	SATURN	W.	18 45 0	2874	20 17 52	2852	21 51 12	2831	23 25 0	2809
	MARS	E.	28 24 15	3063	26 55 20	3052	25 26 11	3041	23 56 49	3030
	SUN	E.	91 25 40	3183	89 59 11	3167	88 32 22	3151	87 5 14	3134
16	Pollux	W.	72 56 21	2707	74 32 51	2690	76 9 44	2672	77 47 1	2654
	Regulus	W.	37 3 0	2716	38 39 18	2698	40 16 1	2678	41 53 10	2659
	SATURN	W.	31 20 38	2711	32 57 3	2692	34 33 53	2673	36 11 9	2653
	SUN	E.	79 44 20	3045	78 15 3	3026	76 45 23	3007	75 15 19	2989
17	Pollux	W.	85 59 39	2561	87 39 27	2542	89 19 42	2523	91 0 23	2504
	Regulus	W.	50 5 29	2561	51 45 17	2542	53 25 32	2522	55 6 14	2503
	SATURN	W.	44 24 6	2556	46 4 1	2536	47 44 24	2517	49 25 14	2497
	SUN	E.	67 38 52	2888	66 6 18	2867	64 33 17	2847	62 59 50	2827

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
9	α Arietis	W.	70° 14′ 46″	3227	71° 40′ 23″	3225	73° 6′ 2″	3225	74° 31′ 42″	3223
	Aldebaran	W.	38 33 41	3089	40 2 4	3090	41 30 26	3090	42 58 48	3090
	Regulus	E.	42 1 18	3095	40 33 2	3097	39 4 49	3101	37 36 40	3103
	Saturn	E.	47 36 31	3087	46 8 5	3089	44 39 42	3091	43 11 21	3092
	Mars	E.	91 1 22	3301	89 37 12	3303	88 13 4	3304	86 48 57	3306
	Spica	E.	96 3 34	3105	94 35 30	3106	93 7 28	3107	91 39 27	3109
10	Aldebaran	W.	50 20 40	3088	51 49 4	3087	53 17 30	3085	54 45 58	3083
	Regulus	E.	30 16 46	3118	28 48 58	3121	27 21 14	3124	25 53 34	3129
	Saturn	E.	35 50 2	3099	34 21 51	3099	32 53 40	3100	31 25 30	3101
	Mars	E.	79 48 35	3306	78 24 31	3306	77 0 26	3305	75 36 20	3303
	Spica	E.	84 19 35	3110	82 51 37	3110	81 23 39	3109	79 55 40	3107
11	Aldebaran	W.	62 8 54	3071	63 37 39	3067	65 6 29	3063	66 35 24	3059
	Saturn	E.	24 4 53	3105	22 36 50	3107	21 8 49	3110	19 40 51	3114
	Mars	E.	68 35 19	3292	67 10 58	3288	65 46 33	3284	64 22 3	3281
	Spica	E.	72 35 18	3098	71 7 6	3096	69 38 51	3093	68 10 33	3090
	Sun	E.	130 15 45	3452	128 54 27	3448	127 33 5	3444	126 11 38	3439
12	Aldebaran	W.	74 1 25	3032	75 30 58	3026	77 0 39	3018	78 30 29	3011
	Pollux	W.	30 2 59	3087	31 31 24	3076	33 0 3	3065	34 28 56	3054
	Mars	E.	57 18 16	3254	55 53 11	3248	54 27 59	3242	53 2 39	3234
	Spica	E.	60 47 53	3069	59 19 5	3064	57 50 11	3058	56 21 10	3052
	Sun	E.	119 22 58	3410	118 0 53	3403	116 38 40	3396	115 16 19	3388
13	Aldebaran	W.	86 2 4	2969	87 32 56	2958	89 4 1	2948	90 35 19	2938
	Pollux	W.	41 56 46	2997	43 27 3	2985	44 57 34	2973	46 28 20	2962
	Mars	E.	45 53 40	3193	44 27 22	3183	43 0 52	3173	41 34 11	3163
	Spica	E.	48 54 17	3022	47 24 31	3014	45 54 36	3007	44 24 32	3001
	Sun	E.	108 22 6	3341	106 58 42	3331	105 35 6	3319	104 11 17	3307
14	Aldebaran	W.	98 15 18	2879	99 48 4	2866	101 21 7	2852	102 54 27	2838
	Pollux	W.	54 6 7	2896	55 38 31	2882	57 11 13	2867	58 44 14	2853
	Mars	E.	34 17 37	3109	32 49 38	3097	31 21 25	3085	29 52 57	3073
	Spica	E.	36 52 7	2968	35 21 14	2962	33 50 14	2958	32 19 8	2954
	Sun	E.	97 8 37	3243	95 43 19	3229	94 17 44	3214	92 51 51	3198
15	Pollux	W.	66 34 7	2775	68 9 7	2759	69 44 29	2741	71 20 14	2725
	Regulus	W.	30 42 1	2793	32 16 38	2774	33 51 40	2755	35 27 7	2736
	Saturn	W.	24 59 16	2789	26 33 58	2769	28 9 6	2750	29 44 39	2731
	Mars	E.	22 27 14	3022	20 57 28	3014	19 27 33	3009	17 57 31	3007
	Sun	E.	85 37 46	3117	84 9 57	3099	82 41 46	3082	81 13 14	3064
16	Pollux	W.	79 24 43	2636	81 2 49	2618	82 41 20	2599	84 20 17	2580
	Regulus	W.	43 30 45	2640	45 8 46	2620	46 47 14	2601	48 26 8	2581
	Saturn	W.	37 48 52	2634	39 27 1	2615	41 5 36	2595	42 44 38	2576
	Sun	E.	73 44 52	2969	72 14 0	2949	70 42 43	2928	69 11 0	2909
17	Pollux	W.	92 41 30	2485	94 23 4	2466	96 5 5	2447	97 47 33	2429
	Regulus	W.	56 47 23	2483	58 29 0	2463	60 11 5	2443	61 53 38	2424
	Saturn	W.	51 6 32	2477	52 48 17	2458	54 30 30	2438	56 13 11	2418
	Sun	E.	61 25 57	2806	59 51 37	2785	58 16 50	2764	56 41 35	2744

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
18	Regulus	W.	63° 36′ 38″	2405	65° 20′ 6″	2385	67° 4′ 2″	2366	68° 48′ 26″	2346
	Saturn	W.	57 56 20	2398	59 39 57	2379	61 24 2	2359	63 8 35	2341
	Sun	E.	55 5 53	2723	53 29 44	2702	51 53 7	2682	50 16 3	2661
19	Regulus	W.	77 37 17	2254	79 24 24	2237	81 11 57	2220	82 59 55	2203
	Saturn	W.	71 58 10	2248	73 45 26	2231	75 33 8	2213	77 21 16	2196
	Spica	W.	24 20 36	2433	26 3 24	2392	27 47 10	2356	29 31 48	2324
	Mars	W.	23 10 2	2475	24 51 51	2450	26 34 15	2426	28 17 12	2405
	Sun	E.	42 3 54	2563	40 24 8	2544	38 43 56	2526	37 3 19	2509
20	Saturn	W.	86 28 6	2118	88 18 37	2104	90 9 30	2090	92 0 44	2078
	Spica	W.	38 25 28	2198	40 13 58	2178	42 2 59	2159	43 52 28	2142
	Mars	W.	36 59 13	2311	38 44 57	2294	40 31 5	2279	42 17 35	2264
	Sun	E.	28 34 9	2425	26 51 10	2410	25 7 49	2395	23 24 7	2382
24	Sun	W.	27 51 50	2327	29 37 10	2337	31 22 15	2348	33 7 4	2360
	α Pegasi	E.	54 51 50	2692	53 15 0	2735	51 39 7	2782	50 4 16	2835
	α Arietis	E.	95 45 53	2164	93 56 31	2172	92 7 22	2182	90 18 28	2193
25	Sun	W.	41 46 40	2427	43 29 36	2442	45 12 11	2458	46 54 24	2473
	α Arietis	E.	81 18 26	2260	79 31 28	2275	77 44 52	2291	75 58 40	2309
	Aldebaran	E.	112 7 7	2125	110 16 46	2139	108 26 46	2153	106 37 8	2168
26	Sun	W.	55 19 45	2558	56 59 38	2576	58 39 6	2594	60 18 9	2612
	α Arietis	E.	67 14 15	2405	65 30 47	2426	63 47 50	2448	62 5 24	2472
	Aldebaran	E.	97 34 38	2346	95 47 19	2362	94 0 24	2379	92 13 54	2396
27	Sun	W.	68 27 11	2705	70 3 44	2724	71 39 52	2743	73 15 35	2761
	α Arietis	E.	53 41 36	2598	52 2 38	2626	50 24 18	2655	48 46 37	2685
	Aldebaran	E.	83 27 39	2382	81 43 39	2401	80 0 5	2417	78 16 55	2435
28	Sun	W.	81 8 3	2854	82 41 21	2873	84 14 15	2891	85 46 46	2909
	Fomalhaut	W.	29 36 49	3346	31 0 7	3286	32 24 35	3236	33 50 2	3194
	α Arietis	E.	40 49 7	2865	39 16 3	2907	37 43 53	2954	36 12 42	3004
	Aldebaran	E.	69 47 16	2521	68 6 32	2538	66 26 12	2556	64 46 16	2572
29	Sun	W.	93 23 47	2994	94 54 7	3010	96 24 7	3027	97 53 46	3043
	Fomalhaut	W.	41 6 57	3080	42 35 31	3069	44 4 19	3060	45 33 18	3053
	Aldebaran	E.	56 32 13	2653	54 54 30	2669	53 17 8	2684	51 40 6	2699
	Pollux	E.	100 45 35	2659	99 8 0	2675	97 30 46	2689	95 53 52	2704
30	Sun	W.	105 17 17	3118	106 45 5	3132	108 12 36	3145	109 39 51	3159
	Fomalhaut	W.	52 59 27	3046	54 28 43	3047	55 57 57	3050	57 27 8	3052
	α Pegasi	W.	40 9 14	3890	41 22 44	3833	42 37 12	3783	43 52 32	3740
	Aldebaran	E.	43 39 55	2771	42 4 49	2785	40 30 1	2799	38 55 32	2813
	Pollux	E.	87 54 4	2772	86 19 0	2785	84 44 13	2798	83 9 43	2811
31	Sun	W.	116 52 11	3220	118 17 56	3232	119 43 27	3243	121 8 45	3253
	Fomalhaut	W.	64 51 58	3073	66 20 40	3079	67 49 15	3085	69 17 43	3090
	α Pegasi	W.	50 19 5	3586	51 37 55	3565	52 57 7	3548	54 16 38	3532
	Aldebaran	E.	31 7 24	2877	29 34 36	2891	28 2 5	2905	26 29 52	2919
	Pollux	E.	75 21 6	2868	73 48 6	2879	72 15 20	2890	70 42 48	2900

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XV$^{\mathrm{h}}$.	P. L. of Diff.	XVIII$^{\mathrm{h}}$	P. L. of Diff.	XXI$^{\mathrm{h}}$.	P. L. of Diff.
18	Regulus	W.	70° 33′ 18″	2328	72° 18′ 37″	2309	74° 4′ 23″	2290	75° 50′ 37″	2272
	Saturn	W.	64 53 35	2322	66 39 2	2303	68 24 57	2284	70 11 20	2266
	Sun	E.	48 38 31	2641	47 0 32	2621	45 22 6	2601	43 43 13	2583
19	Regulus	W.	84 48 18	2186	86 37 6	2170	88 26 19	2155	90 15 55	2140
	Saturn	W.	79 9 50	2179	80 58 49	2163	82 48 12	2148	84 37 58	2134
	Spica	W.	31 17 12	2295	33 3 19	2268	34 50 6	2243	36 37 30	2220
	Mars	W.	30 0 39	2384	31 44 36	2365	33 29 1	2346	35 13 54	2328
	Sun	E.	35 22 18	2491	33 40 52	2473	31 59 1	2456	30 16 46	2441
20	Saturn	W.	93 52 17	2066	95 44 9	2054	97 36 19	2042	99 28 47	2033
	Spica	W.	45 42 23	2126	47 32 43	2110	49 23 27	2096	51 14 32	2083
	Mars	W.	44 4 27	2250	45 51 40	2237	47 39 12	2225	49 27 2	2214
	Sun	E.	21 40 6	2368	19 55 46	2357	18 11 9	2345	16 26 15	2333
24	Sun	W.	34 51 36	2373	36 35 50	2385	38 19 46	2398	40 3 23	2412
	α Pegasi	E.	48 30 33	2893	46 58 5	2958	45 26 59	3028	43 57 21	3106
	α Arietis	E.	88 29 50	2204	86 41 29	2217	84 53 27	2231	83 5 46	2245
25	Sun	W.	48 36 15	2489	50 17 43	2507	51 58 47	2523	53 39 28	2540
	α Arietis	E.	74 12 53	2326	72 27 32	2345	70 42 38	2364	68 58 12	2384
	Aldebaran	E.	104 47 52	2182	102 58 58	2198	101 10 28	2214	99 22 21	2230
26	Sun	W.	61 56 48	2630	63 35 2	2649	65 12 50	2668	66 50 13	2687
	α Arietis	E.	60 23 31	2495	58 42 11	2519	57 1 24	2544	55 21 12	2570
	Aldebaran	E.	90 27 49	2313	88 42 9	2331	86 56 54	2348	85 12 4	2365
27	Sun	W.	74 50 54	2780	76 25 48	2799	78 0 17	2818	79 34 22	2836
	α Arietis	E.	47 9 37	2717	45 33 20	2751	43 57 48	2787	42 23 3	2825
	Aldebaran	E.	76 34 10	2453	74 51 50	2470	73 9 54	2487	71 28 23	2504
28	Sun	W.	87 18 54	2926	88 50 40	2943	90 22 4	2961	91 53 6	2977
	Fomalhaut	W.	35 16 18	3160	36 43 15	3133	38 10 44	3111	39 38 40	3094
	α Arietis	E.	34 42 34	3059	33 13 34	3119	31 45 48	3186	30 19 22	3260
	Aldebaran	E.	63 6 43	2588	61 27 32	2605	59 48 44	2621	58 10 18	2637
29	Sun	W.	99 23 6	3058	100 52 7	3073	102 20 49	3089	103 49 12	3104
	Fomalhaut	W.	47 2 25	3049	48 31 37	3047	50 0 52	3045	51 30 9	3044
	Aldebaran	E.	50 3 25	2714	48 27 4	2729	46 51 2	2743	45 15 19	2757
	Pollux	E.	94 17 17	2718	92 41 1	2732	91 5 4	2746	89 29 25	2760
30	Sun	W.	111 6 49	3173	112 33 31	3184	113 59 59	3197	115 26 12	3209
	Fomalhaut	W.	58 56 16	3056	60 25 19	3060	61 54 17	3065	63 23 10	3069
	α Pegasi	W.	45 8 37	3701	46 25 23	3666	47 42 46	3636	49 0 41	3610
	Aldebaran	E.	37 21 21	2826	35 47 27	2838	34 13 49	2852	32 40 28	2865
	Pollux	E.	81 35 29	2823	80 1 31	2835	78 27 48	2846	76 54 20	2857
31	Sun	W.	122 33 51	3264	123 58 45	3274	125 23 27	3284	126 47 57	3294
	Fomalhaut	W.	70 46 5	3096	72 14 20	3101	73 42 28	3107	75 10 29	3113
	α Pegasi	W.	55 36 27	3516	56 56 33	3505	58 16 52	3494	59 37 23	3484
	Aldebaran	E.	24 57 57	2932	23 26 19	2946	21 54 59	2962	20 23 59	2980
	Pollux	E.	69 10 29	2909	67 38 22	2919	66 6 27	2928	64 34 44	2937

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.	Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	18 59 37.02	+17.834	−24 41 1.3	+17.92	0 14.3	1	22.10 59.17	+ 6.309	−10 22 18.8	+78.36	1 23.3
2	19 6 45.32	17.856	24 33 5.6	21.73	0 17.5	2	22 13 13.27	4.850	9 52 17.3	71.58	1 21.6
3	19 13 54.07	17.871	24 23 38.0	25.58	0 20.8	3	22 14 51.25	3.300	9 25 11.8	63.69	1 19.3
4	19 21 3.08	17.878	24 12 37.8	29.45	0 24.0	4	22 15 51.12	1.679	9 1 28.3	54.77	1 16.3
5	19 28 12.17	17.878	24 0 4.1	33.36	0 27.2	5	22 16 11.47	+ 0.010	8 41 30.4	44.90	1 12.7
6	19 35 21.13	+17.868	−23 45 56.3	+37.29	0 30.4	6	22 15 51.49	− 1.675	− 8 25 39.4	+34.93	1 8.4
7	19 42 29.73	17.848	23 30 14.2	41.23	0 33.6	7	22 14 51.23	3.340	8 14 12.0	22.97	1 3.4
8	19 49 37.73	17.817	23 12 57.2	45.18	0 36.8	8	22 13 11.67	4.942	8 7 19.7	+11.36	0 57.8
9	19 56 44.86	17.775	22 54 5.3	49.14	0 40.0	9	22 10 54.85	6.437	8 5 7.4	− 0.32	0 51.6
10	20 3 50.84	17.720	22 33 38.5	53.09	0 43.2	10	22 8 3.91	7.779	8 7 33.3	11.76	0 44.8
11	20 10 55.33	+17.651	−22 11 37.0	+57.03	0 46.3	11	22 4 43.02	− 8.925	− 8 14 27.5	−22.62	0 37.5
12	20 17 57.98	17.566	21 48 1.4	60.94	0 49.4	12	22 0 57.39	9.835	8 25 32.3	32.61	0 29.9
13	20 24 58.36	17.463	21 22 52.6	64.80	0 52.4	13	21 56 53.03	10.484	8 40 23.3	41.41	0 21.9
14	20 31 56.03	17.339	20 56 11.6	68.60	0 55.4	14	21 52 36.43	10.852	8 58 29.1	48.83	0 13.7
15	20 38 50.47	17.193	20 28 0.5	72.31	0 58.4	15	21 48 14.41	10.936	9 19 14.9	54.71	0 5.5 23 57.2
16	20 45 41.10	+17.021	−19 58 21.6	+75.92	1 1.4	16	21 43 53.68	−10.747	− 9 42 2.4	−58.98	23 49.1
17	20 52 27.26	16.820	19 27 17.6	79.39	1 4.2	17	21 39 40.58	10.305	10 6 13.3	61.67	23 41.2
18	20 59 8.19	16 585	18 54 52.0	82.70	1 6.9	18	21 35 40.82	9.649	10 31 10.6	62.86	23 33.6
19	21 5 43.04	16.312	18 21 9.5	85.80	1 9.6	19	21 31 59.26	8.794	10 56 19.9	62.70	23 26.4
20	21 12 10.83	15.996	17 46 15.6	88.64	1 12.1	20	21 28 39.86	7.802	11 21 11.1	61.38	23 19.6
21	21 18 30.43	+15.629	−17 10 17.2	+91.17	1 14.5	21	21 25 45.60	− 6.705	−11 45 18.3	−59.07	23 13.2
22	21 24 40.59	15.207	16 33 22.1	93.34	1 16.7	22	21 23 18.55	5.540	12 8 20.1	55.97	23 7.3
23	21 30 39.88	14.722	15 55 39.8	95.10	1 18.7	23	21 21 19.95	4.340	12 29 59.9	52.96	23 1.8
24	21 36 26.70	14.167	15 17 21.5	96 35	1 20.5	24	21 19 50.29	3.132	12 50 4.9	48.10	22 56.9
25	21 41 59.25	13.532	14 38 40.1	97.01	1 22.1	25	21 18 49.49	1.939	13 8 26.1	43.62	22 52.4
26	21 47 15.54	+12.810	−13 59 50.6	+97.00	1 23.5	26	21 18 16.96	− 0.778	−13 24 56.9	−38.93	22 48.3
27	21 52 13.39	11.990	13 21 10.2	96.24	1 24.5	27	21 18 11.78	+ 0.338	13 39 33.6	34.12	22 44.7
28	21 56 50.45	11.076	12 42 57.9	94.64	1 25.1	28	21 18 32.78	1.402	13 52 14.0	29.25	22 41.5
29	22 1 4.20	10.051	12 5 34.7	92.12	1 25.4	29	21 19 18.64	2.409	14 2 57.3	24.37	22 38.7
30	22 4 52.02	8.915	11 29 23.8	88.61	1 25.2	30	21 20 27.93	3.355	14 11 43.9	19.52	22 36.3
31	22 8 11.23	+ 7.667	−10 54 49.9	+84.04	1 24.5	31	21 21 59.17	+ 4.238	−14 18 34.7	−14.72	22 34.2
32	22 10 59.17	+ 6.309	−10 22 18.8	+78.36	1 23.3	32	21 23 50.89	+ 5.062	−14 23 31.2	−10.00	22 32.4

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.
Semidiameter . .	2″.3	2″.4	2″.5	2″.6	2″.8	3″.1	3″.6
Hor. Parallax . .	6.2	6.3	6.6	6.9	7.5	8.3	9.5

Day of the Month.	5th.	10th.	15th.	20th.	25th.
Semidiameter.	4″.2	4″.8	5″.2	5″.2	4″.8
Hor. Parallax	11.1	12.8	13.8	13.6	12.8

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

	MARCH.						APRIL.				
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	21 19 18.64	+ 2.409	−14 2 57.3	−24.37	22 38.7	1	23 29 22.70	+14.640	− 5 56 41.2	+ 92.30	22 51.1
2	21 20 27.93	3.355	14 11 43.9	19.52	22 36.3	2	23 35 16.09	14.809	5 19 11.5	95.16	22 53.1
3	21 21 59.17	4.238	14 18 34.7	14.72	22 34.2	3	23 41 13.57	14.981	4 40 33.7	97.98	22 55.2
4	21 23 50.89	5.062	14 23 31.2	10.00	22 32.4	4	23 47 15.20	15.156	4 0 48.9	100.75	22 57.3
5	21 26 1.66	5.827	14 26 35.4	5.36	22 30.9	5	23 53 21.07	15.334	3 19 58.2	103.47	22 59.6
6	21 28 30.13	+ 6.536	−14 27 49.3	− 0.81	22 29.7	6	23 59 31.27	+15.516	− 2 38 3.0	+106.12	23 1.9
7	21 31 14.97	7.192	14 27 15.0	+ 3.65	22 28.8	7	0 5 45.90	15.704	1 55 4.7	108.72	23 4.3
8	21 34 14.94	7.798	14 24 54.8	8.02	22 28.1	8	0 12 5.13	15.899	1 11 4.8	111.26	23 6.7
9	21 37 28.90	8.358	14 20 50.8	12.30	22 27.5	9	0 18 29.10	16.100	− 0 26 4.9	113.72	23 9.2
10	21 40 55.78	8.875	14 15 5.1	16.49	22 27.2	10	0 24 57.97	16.308	+ 0 19 53.2	116.11	23 11.9
11	21 44 34.60	+ 9.353	−14 7 39.8	+20.60	22 27.1	11	0 31 31.94	+16.524	+ 1 6 47.5	+118.40	23 14.6
12	21 48 24.44	9.795	13 58 37.0	24.62	22 27.2	12	0 38 11.18	16.748	1 54 35.8	120.60	23 17.4
13	21 52 24.49	10.203	13 47 58.6	28.57	22 27.4	13	0 44 55.91	16.981	2 43 15.6	122.69	23 20.3
14	21 56 33.98	10.582	13 35 46.3	32.44	22 27.7	14	0 51 46.33	17.222	3 32 44.0	124.65	23 23.3
15	22 0 52.21	10.933	13 22 1.9	36.25	22 28.2	15	0 58 42.64	17.472	4 22 57.7	126.47	23 26.4
16	22 5 18.56	+11.259	−13 6 47.0	+39.98	22 28.8	16	1 5 45.04	+17.729	+ 5 13 53.2	+128.13	23 29.6
17	22 9 52.45	11.562	12 50 3.3	43.65	22 29.6	17	1 12 53.70	17.994	6 5 26.3	129.59	23 32.9
18	22 14 33.38	11.846	12 31 52.4	47.25	22 30.4	18	1 20 8.81	18.266	6 57 31.9	130.84	23 36.3
19	22 19 20.89	12.111	12 12 15.7	50.80	22 31.4	19	1 27 30.48	18.541	7 50 4.6	131.85	23 39.9
20	22 24 14.56	12.359	11 51 14.5	54.29	22 32.4	20	1 34 58.79	18.819	8 42 58.4	132.59	23 43.5
21	22 29 14.02	+12.594	−11 28 50.0	+57.73	22 33.5	21	1 42 33.79	+19.098	+ 9 36 6.4	+133.02	23 47.3
22	22 34 18.95	12.816	11 5 3.7	61.11	22 34.8	22	1 50 15.46	19.374	10 29 20.5	133.10	23 51.2
23	22 39 29.06	13.026	10 39 56.9	64.44	22 36.1	23	1 58 3.67	19.643	11 22 32.1	132.80	23 55.1
24	22 44 44.11	13.226	10 13 30.8	67.72	22 37.5	24	2 5 58.22	19.901	12 15 31.5	132.08	23 59.2
25	22 50 3.87	13.418	9 45 46.5	70.96	22 38.9	25	2 13 58.78	20.143	13 8 8.4	130.91	
26	22 55 28.16	+13.604	− 9 16 45.1	+74.15	22 40.4	26	2 22 4.94	+20.366	+14 0 11.5	+129.26	0 3.4
27	23 0 56.83	13.784	8 46 27.8	77.29	22 42.0	27	2 30 16.15	20.563	14 51 29.1	127.11	0 7.7
28	23 6 29.76	13.960	8 14 55.8	80.38	22 43.7	28	2 38 31.73	20.729	15 41 48.7	124.44	0 12.0
29	23 12 6.87	14.132	7 42 10.0	83.43	22 45.5	29	2 46 50.85	20.858	16 30 57.8	121.24	0 16.4
30	23 17 48.09	14.302	7 8 11.6	86.43	22 47.3	30	2 55 12.60	20.947	17 18 43.9	117.52	0 20.8
31	23 23 33.37	+14.471	− 6 33 1.6	+89.39	22 49.2	31	3 3 35.94	+20.990	+18 4 54.7	+113.30	0 25.2
32	23 29 22.70	+14.640	− 5 56 41.2	+92.30	22 51.1	32	3 11 59.75	+20.965	+18 49 18.6	+108.62	0 29.7

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.
Semidiameter . .	4″.4	4″.0	3″.7	3″.4	3″.2	3″.0	Semidiameter . .	2″.8	2″.7	2″.6	2″.5	2″.5	2″.5
Hor. Parallax . .	11.6	10.6	9.7	9.0	8.4	7.9	Hor. Parallax . .	7.5	7.2	6.9	6.7	6.6	6.7

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

MAY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	3 3 35.94	+20.990	+18 4 54.7	+113.30	0 25.2
2	3 11 59.75	20.985	18 49 18.6	108.62	0 29.7
3	3 20 22.83	20.930	19 31 45.0	103.51	0 34.2
4	3 28 43.97	20.823	20 12 4.2	98.03	0 38.6
5	3 37 1.94	20.664	20 50 8.2	92.26	0 43.0
6	3 45 15.42	+20.454	+21 25 50.5	+ 86.23	0 47.3
7	3 53 23.32	20.196	21 59 5.7	80.02	0 51.5
8	4 1 24.45	19.891	22 29 50.3	73.69	0 55.5
9	4 9 17.74	19.542	22 58 2.6	67.33	0 59.5
10	4 17 2.17	19.154	23 23 42.0	60.96	1 3.3
11	4 24 36.82	+18.728	+23 46 49.0	+ 54.64	1 6.9
12	4 32 0.83	18.268	24 7 25.5	48.42	1 10.4
13	4 39 13.41	17.776	24 25 34.2	42.33	1 13.6
14	4 46 13.85	17.256	24 41 18.8	36.41	1 16.7
15	4 53 1.50	16.711	24 54 43.2	30.66	1 19.6
16	4 59 35.76	+16.140	+25 5 52.2	+ 25.12	1 22.2
17	5 5 56.05	15.547	25 14 50.8	19.80	1 24.6
18	5 12 1.86	14.934	25 21 44.3	14.70	1 26.7
19	5 17 52.73	14.301	25 26 38.2	9.83	1 28.6
20	5 23 28.14	13.648	25 29 37.9	5.18	1 30.2
21	5 28 47.67	+12.977	+25 30 49.0	+ 0.78	1 31.6
22	5 33 50.89	12.288	25 30 17.2	− 3.39	1 32.7
23	5 38 37.37	11.582	25 28 8.0	7.34	1 33.5
24	5 43 6.69	10.858	25 24 26.8	11.06	1 34.0
25	5 47 18.44	10.118	25 19 19.1	14.55	1 34.3
26	5 51 12.22	+ 9.361	+25 12 50.2	− 17.82	1 34.2
27	5 54 47.65	8.589	25 5 5.4	20.87	1 33.8
28	5 58 4.36	7.801	24 56 9.8	23.72	1 33.1
29	6 1 1.98	6.996	24 46 8.5	26.35	1 32.1
30	6 3 40.16	6.182	24 35 6.5	28.78	1 30.8
31	6 5 58.60	+ 5.354	+24 23 8.5	− 31.01	1 29.2
32	6 7 57.05	+ 4.516	+24 10 19.5	− 33.04	1 27.2

JUNE.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	6 7 57.05	+4.516	+24 10 19.5	−33.04	1 27.2
2	6 9 35.30	3.671	23 56 44.3	34.86	1 24.9
3	6 10 53.21	2.822	23 42 27.8	36.48	1 22.2
4	6 11 50.74	1.973	23 27 34.7	37.91	1 19.2
5	6 12 27.95	1.128	23 12 9.9	39.12	1 15.9
6	6 12 45.00	+0.295	+22 56 18.5	−40.13	1 12.2
7	6 12 42.23	−0.522	22 40 5.4	40.92	1 8.2
8	6 12 20.12	1.316	22 23 36.0	41.49	1 3.9
9	6 11 39.34	2.077	22 6 55.8	41.82	0 59.3
10	6 10 40.76	2.798	21 50 10.7	41.90	0 54.4
11	6 9 25.44	−3.470	+21 33 26.7	−41.72	0 49.2
12	6 7 54.68	4.082	21 16 50.3	41.27	0 43.7
13	6 6 10.02	4.628	21 0 28.0	40.54	0 38.0
14	6 4 13.14	5.098	20 44 27.0	39.50	0 32.1
15	6 2 6.01	5.483	20 28 54.5	38.15	0 26.0
16	5 59 50.71	−5.777	+20 13 58.1	−36.49	0 20.0
17	5 57 29.49	5.975	19 59 45.3	34.52	0 13.7
18	5 55 4.70	6.074	19 46 23.8	32.23	0 7.4
19	5 52 38.76	6.070	19 34 0.7	29.64	0 1.0 23 54.7
20	5 50 14.13	5.965	19 22 43.2	26.77	23 48.4
21	5 47 53.23	−5.760	+19 12 37.8	−23.64	23 42.3
22	5 45 38.40	5.460	19 3 50.4	20.28	23 36.3
23	5 43 31.85	5.071	18 56 26.0	16.72	23 30.4
24	5 41 35.67	4.597	18 50 28.8	13.01	23 24.7
25	5 39 51.80	4.046	18 46 2.0	9.20	23 19.3
26	5 38 21.98	−3.428	+18 43 7.4	− 5.34	23 14.1
27	5 37 7.74	2.750	18 41 45.9	− 1.46	23 9.3
28	5 36 10.39	2.021	18 41 57.3	+ 2.40	23 4.7
29	5 35 31.07	1.249	18 43 40.4	6.17	23 0.4
30	5 35 10.73	−0.441	18 46 52.6	9.82	22 56.4
31	5 35 10.14	+0.396	+18 51 30.7	+13.32	22 52.8
32	5 35 29.92	+1.255	+18 57 30.6	+16.63	22 49.5

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.
	″	″	″	″	″	″	″
Semidiameter . .	2.6	2.8	3.0	3.3	3.7	4.2	4.7
Hor. Parallax . .	6.9	7.4	8.0	8.9	9.9	11.2	12.5

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.
	″	″	″	″	″	″
Semidiameter . .	5.3	5.7	6.0	6.0	5.7	5.2
Hor. Parallax . .	13.9	15.1	15.9	15.9	15.1	13.8

Note.—The sign + indicates north declinations: the sign — indicates south declinations.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	5 35 10.14	+ 0.396	+18 51 30.7	+13.32	22 52.8	1	8 19 33.12	+21.851	+20 56 59.0	− 54.85	23 43.1
2	5 35 29.92	1.255	18 57 30.6	16.63	22 49.5	2	8 28 16.93	21.789	20 33 48.4	60.99	23 47.9
3	5 36 10.54	2.132	19 4 47.0	19.70	22 46.6	3	8 36 58.51	21.666	20 8 13.7	66.84	23 52.6
4	5 37 12.35	3.021	19 13 14.3	22.53	22 44.0	4	8 45 36.46	21.488	19 40 22.5	72.36	23 57.2
5	5 38 35.61	3.919	19 22 46.3	25.08	22 41.8	5	8 54 9.59	21.265	19 10 23.4	77.51	
6	5 40 20.50	+ 4.823	+19 33 15.8	+27.32	22 40.0	6	9 2 36 89	+21.003	+18 38 25.4	− 82.26	0 1.8
7	5 42 27.13	5.730	19 44 35.1	29.24	22 38.5	7	9 10 57.50	20.710	18 4 38.1	86.62	0 6.2
8	5 44 55.56	6.638	19 56 36.4	30.81	22 37.4	8	9 19 10.75	20.392	17 29 10.9	90.58	0 10.5
9	5 47 45.77	7.546	20 9 11.2	32.02	22 36.6	9	9 27 16.15	20.056	16 52 13.2	94.16	0 14.7
10	5 50 57.74	8.451	20 22 10.4	32.85	22 36.2	10	9 35 13.34	19.708	16 13 54.3	97.36	0 18.7
11	5 54 31.39	+ 9.353	+20 35 24.8	+33.28	22 36.1	11	9 43 2.07	+19.352	+15 34 23.0	−100.19	0 22.5
12	5 58 26.64	10.250	20 48 44.7	33.30	22 36.4	12	9 50 42.20	18.993	14 53 47.7	102.69	0 26.3
13	6 2 43.36	11.142	21 1 59.8	32.88	22 37.1	13	9 58 13.73	18.635	14 12 16.3	104.87	0 29.8
14	6 7 21.39	12.026	21 14 59.6	32.02	22 38.1	14	10 5 36.68	18.279	13 29 56.2	106.75	0 33.3
15	6 12 20.52	12.900	21 27 33.1	30.69	22 39.5	15	10 12 51.16	17.929	12 46 54.4	108 35	0 36.6
16	6 17 40.47	+13.761	+21 39 29.0	+28.88	22 41.2	16	10 19 57.31	+17.585	+12 3 17.2	−109.70	0 39.8
17	6 23 20.91	14.606	21 50 35.7	26.59	22 43.3	17	10 26 55.32	17.250	11 19 10.6	110.81	0 42.8
18	6 29 21.42	15.433	22 0 41.4	23.80	22 45.7	18	10 33 45.40	16.925	10 34 40.2	111.70	0 45.7
19	6 35 41.50	16.236	22 9 34.1	20.50	22 48.4	19	10 40 27.79	16.609	9 49 50.8	112.39	0 48.4
20	6 42 20.51	17.010	22 17 1.6	16.70	22 51.4	20	10 47 2.73	16.304	9 4 47.1	112.89	0 51.1
21	6 49 17.68	+17.748	+22 22 52.0	+12.42	22 54.7	21	10 53 30.46	+16.009	+ 8 19 33.4	−113.22	0 53.6
22	6 56 32.07	18.444	22 26 53.7	7.65	22 58.2	22	10 59 51.23	15.724	7 34 13.7	113.39	0 56.0
23	7 4 2.62	19.093	22 28 55.6	+ 2.42	23 2.0	23	11 6 5.28	15.449	6 48 51.5	113.42	0 58.3
24	7 11 48.07	19.686	22 28 47.5	− 3.19	23 6.1	24	11 12 12.86	15.184	6 3 30.4	113.32	1 0.5
25	7 19 46.99	20.215	22 26 20.4	9.14	23 10.3	25	11 18 14.21	14.929	5 18 13.4	113.08	1 2.6
26	7 27 57.84	+20.677	+22 21 26.3	−15.40	23 14.7	26	11 24 9.55	+14.683	+ 4 33 3.5	−112.72	1 4.6
27	7 36 18.92	21.066	22 13 58.9	21.90	23 19.3	27	11 29 59.05	14.445	3 48 3.5	112.26	1 6.4
28	7 44 48.40	21.378	22 3 54.0	28.53	23 24.0	28	11 35 42.97	14.215	3 3 15.9	111.69	1 8.2
29	7 53 24.44	21.612	21 51 9.1	35.22	23 28.7	29	11 41 21.45	13.993	2 18 43.1	111.02	1 9.9
30	8 2 5.13	21.766	21 35 43.6	41.89	23 33.5	30	11 46 54.67	13.777	1 34 27.6	110.25	1 11.5
31	8 10 48.62	+21.845	+21 17 39.1	−48.46	23 38.3	31	11 52 22.77	+13.566	+ 0 50 31.6	−109.40	1 13.0
32	8 19 33.12	+21.851	+20 56 59.0	−54.85	23 43.1	32	11 57 45.89	+13.361	+ 0 6 57.2	−106.45	1 14.5

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.	Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
Semidiameter . .	4.″6	4.″1	3.″6	3.″2	2.″9	2.″6	Semidiameter . .	2.″5	2.″5	2.″5	2.″6	2.″6	2.″7
Hor. Parallax . .	12.3	10.8	9.5	8.4	7.6	7.0	Hor. Parallax . .	6.7	6.5	6.5	6.6	6.8	7.0

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	11 57 45.89	+13.361	+ 0 6 57.2	−108.45	1 14.5	1	13 51 57.21	+ 2.493	−15 18 9.7	− 17.52	1 10.2
2	12 3 4.14	13.160	− 0 36 13.4	107.42	1 15.8	2	13 52 45.82	1.546	15 23 38.2	9.75	1 7.0
3	12 8 17.62	12.963	1 18 58.1	106.30	1 17.1	3	13 53 10.89	+ 0.532	15 25 52.5	− 1.33	1 3.4
4	12 13 26.39	12.769	2 1 15.0	105.10	1 18.3	4	13 53 10.85	− 0.547	15 24 37.0	+ 7.74	0 59.4
5	12 18 30.52	12.576	2 43 2.1	103.81	1 19.4	5	13 52 44.21	1.682	15 19 35.8	17.46	0 55.1
6	12 23 30.02	+12.383	− 3 24 17.2	−102.44	1 20.5	6	13 51 49.80	− 2.860	−15 10 33.4	+ 27.83	0 50.3
7	12 28 24.90	12.191	4 4 58.3	100.98	1 21.5	7	13 50 26.74	4.064	14 57 15.5	38.75	0 45.0
8	12 33 15.16	11.997	4 45 3.3	99.43	1 22 4	8	13 48 34.74	5.268	14 39 30.4	50.07	0 39.2
9	12 38 0.73	11.800	5 24 30.1	97.79	1 23.2	9	13 46 14.16	6.439	14 17 10.6	61.60	0 32.9
10	12 42 41.54	11.600	6 3 16.5	96.06	1 23.9	10	13 43 26.22	7.541	13 50 14.6	73.03	0 26.2
11	12 47 17.48	+11.394	− 6 41 20.2	− 94.23	1 24.6	11	13 40 13.13	− 8.527	−13 18 48.8	+ 84.01	0 19.1
12	12 51 48.41	11.182	7 18 38.7	92.30	1 25.1	12	13 36 38.21	9.351	12 43 9.6	94.06	0 11.6
13	12 56 14.15	10.961	7 55 9.5	90.25	1 25.6	13	13 32 45.95	9.965	12 3 45.1	102.69	0 3.8 23 55.8
14	13 0 34.47	10.730	8 30 49.8	88.09	1 26.0	14	13 28 41.93	10.394	11 21 15.8	109.38	23 47.8
15	13 4 49.10	10.487	9 5 36.8	85.80	1 26.3	15	13 24 32.67	10.397	10 36 34.1	113.65	23 39.8
16	13 8 57.73	+10.229	− 9 39 27.2	− 83.37	1 26.5	16	13 20 25.31	−10.163	− 9 50 42.8	+115.12	23 31.9
17	13 12 59.98	9.955	10 12 17.7	80.80	1 26.6	17	13 16 27.32	9.618	9 4 51.9	113.59	23 24.3
18	13 16 55.42	9.662	10 44 4.5	78.07	1 26.5	18	13 12 46.01	8.776	8 20 14.5	109.02	23 17.1
19	13 20 43.56	9.346	11 14 43.6	75.16	1 26.4	19	13 9 28.16	7.670	7 38 1.8	101.57	23 10.4
20	13 24 23.83	9.005	11 44 10.6	72.06	1 26.1	20	13 6 39.58	6.345	6 59 19.0	91.61	23 4.2
21	13 27 55.59	+ 8.636	−12 12 20.7	− 68.75	1 25.7	21	13 4 24.94	− 4.852	− 6 25 0.9	+ 79.60	22 58 6
22	13 31 18.11	8 235	12 39 8.5	65.20	1 25.1	22	13 2 47.56	3.250	5 55 50.1	66.10	22 53.7
23	13 34 30.59	7.798	13 4 28.0	61.38	1 24.4	23	13 1 49.39	− 1.593	5 32 15.7	51.67	22 49.4
24	13 37 32.10	7.321	13 28 12.7	57.29	1 23.4	24	13 1 31.14	+ 0.068	5 14 33.1	36.85	22 45.8
25	13 40 21.63	6.799	13 50 15.3	52.87	1 22.3	25	13 1 52.36	1.690	5 2 46.3	22.11	22 42.8
26	13 42 58.06	+ 6.228	−14 10 27.7	− 48.10	1 21.0	26	13 2 51.69	+ 3.240	− 4 56 48.3	+ 7.83	22 40.4
27	13 45 20.17	5.605	14 28 40.9	42.94	1 19.4	27	13 4 27.09	4.691	4 56 24.3	− 5.68	22 38.6
28	13 47 26.63	4.923	14 44 45.3	37.35	1 17.5	28	13 6 35.98	6.030	5 1 13.3	18.23	22 37.3
29	13 49 15.99	4.179	14 58 29.7	31.27	1 15.4	29	13 9 15.57	7.248	5 10 50.6	29.69	22 36.5
30	13 50 46.72	3.370	15 9 42.2	24.68	1 13.0	30	13 12 22.90	8.342	5 24 49.1	39.99	22 36.1
31	13 51 57.21	+ 2.493	−15 18 9.7	− 17.52	1 10.2	31	13 15 55.03	+ 9.316	− 5 42 40.6	− 49.11	22 36.0
32	13 52 45.82	+ 1.546	−15 23 38.2	− 9.75	1 7.0	32	13 19 49.09	+10.172	− 6 3 57.2	− 57.08	22 36.2

Day of the Month.	3d.	8th.	13th.	18th.	23d.	28th.	Day of the Month.	3d.	8th.	13th.	18th.	23d.	28th.
	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter . .	2.7	2.9	3.1	3.3	3.6	3.9	Semidiameter . .	4.3	4.7	5.0	4.9	4.3	3.7
Hor. Parallax . .	7.3	7.6	8.1	8.7	9.4	10.3	Hor. Parallax . .	11.4	12.6	13.3	12.9	11.5	9.8

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	13 19 49.09	+10.172	− 6 3 57.2	−57.06	22 36.2
2	13 24 2.45	10.894	6 28 12.0	63.97	22 36.8
3	13 28 32.65	11.577	6 54 59.6	69.83	22 37.6
4	13 33 17.46	12.144	7 23 56.4	74.75	22 38.6
5	13 38 14.93	12.634	7 54 40.6	78.81	22 39.8
6	13 43 23.34	+13.066	− 8 26 52.9	−82.09	22 41.1
7	13 48 41.16	13.420	9 0 15.5	84.68	22 42.6
8	13 54 7.10	13.734	9 34 32.8	86.66	22 44 2
9	13 59 40.05	14.006	10 9 30.9	88.09	22 45.9
10	14 5 19.08	14.241	10 44 57.4	89.04	22 47.7
11	14 11 3.39	+14.447	−11 20 41.6	−89.57	22 49.5
12	14 16 52.32	14.627	11 56 33 8	89.72	22 51.5
13	14 22 45.31	14.786	12 32 25.6	89.54	22 53.5
14	14 28 41.91	14.928	13 8 9.6	89.06	22 55.6
15	14 34 41.74	15.056	13 43 39.2	88.36	22 57.7
16	14 40 44.50	+15.172	−14 18 48.8	−87.41	22 59.8
17	14 46 49.94	15.280	14 53 33.3	86.26	23 2.0
18	14 52 57.86	15.380	15 27 48.0	84.94	23 4.2
19	14 59 8.12	15.474	16 1 28.9	83.45	23 6.5
20	15 5 20.59	15.564	16 34 32.4	81.82	23 8.8
21	15 11 35.17	+15.650	−17 6 55.3	−80.06	23 11.1
22	15 17 51.79	15.734	17 38 34.5	78.18	23 13.5
23	15 24 10.41	15.817	18 9 27.4	76.20	23 15.9
24	15 30 30.99	15.898	18 39 31.5	74.12	23 18.3
25	15 36 53.51	15.978	19 8 44.4	71.95	23 20.8
26	15 43 17.95	+16.058	−19 37 4.2	−69.69	23 23.3
27	15 49 44.30	16.138	20 4 28.7	67.34	23 25.8
28	15 56 12.56	16.217	20 30 56.1	64.93	23 28.4
29	16 2 42.73	16.297	20 56 24.6	62.44	23 31.0
30	16 9 14.83	16.378	21 20 52.5	59.88	23 33.6
31	16 15 48.85	+16.458	−21 44 18.1	−57.95	23 36.3
32	16 22 24.79	+16.538	−22 6 39.9	−54.56	23 39.0

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.
Semidiameter . . .	3″.2	2″.9	2″.7	2″.5	2″.4	2″.4
Hor. Parallax . . .	8.5	7.7	7.1	6.7	6.4	6.2

DECEMBER.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	16 15 48.85	+16.458	−21 44 18.1	−57.95	23 36.3
2	16 22 24.79	16.538	22 6 39.9	54.56	23 39.0
3	16 29 2.65	16.617	22 27 56.3	51.80	23 41.7
4	16 35 42.42	16.697	22 48 5.7	48.98	23 44.5
5	16 42 24.10	16.777	23 7 6.7	46.10	23 47.3
6	16 49 7.68	+16.855	−23 24 57.8	−43.15	23 50.1
7	16 55 53.13	16.932	23 41 37.6	40.15	23 52.9
8	17 2 40.42	17.008	23 57 4.7	37.09	23 55.8
9	17 9 29.52	17.083	24 11 17.5	33.97	23 58.7
10	17 16 20.39	17.155	24 24 14.8	30.79	
11	17 23 12.96	+17.225	−24 35 55.2	−27.56	0 1.7
12	17 30 7.18	17.292	24 46 17.2	24.26	0 4.6
13	17 37 2.96	17.356	24 55 19.4	20.91	0 7.6
14	17 44 0.23	17.416	25 3 0.5	17.50	0 10.6
15	17 50 58.87	17.470	25 9 19.2	14.04	0 13.7
16	17 57 58.77	+17.520	−25 14 14.2	−10.53	0 16.7
17	18 4 59.81	17.565	25 17 44.2	6.96	0 19.8
18	18 12 1.83	17.603	25 19 47.9	− 3.34	0 22.9
19	18 19 4.66	17.633	25 20 24.1	+ 0.33	0 26.0
20	18 26 8.13	17.655	25 19 31.7	4.05	0 29.2
21	18 33 12.04	+17.669	−25 17 9.6	+ 7.80	0 32.3
22	18 40 16.15	17.672	25 13 16.9	11.60	0 35.4
23	18 47 20.20	17.664	25 7 52.6	15.43	0 38.6
24	18 54 23.93	17.644	25 0 56.0	19.29	0 41.7
25	19 1 27.02	17.611	24 52 26.3	23.18	0 44.8
26	19 8 29.14	+17.563	−24 42 23.2	+27.08	0 47 9
27	19 15 29.89	17.497	24 30 46.4	30.99	0 51.0
28	19 22 28.84	17.413	24 17 35.7	34.90	0 54.0
29	19 29 25.53	17.308	24 2 51.4	38.79	0 57.0
30	19 36 19.42	17.179	23 46 34.0	42.65	1 0.0
31	19 43 9.90	+17.024	−23 28 44.5	+46.46	1 2.9
32	19 49 56.32	+16.839	−23 9 24.2	+50.21	1 5.7

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	32d.
Semidiameter . .	2″.3	2″.3	2″.3	2″.3	2″.4	2″.5	2″.6
Hor. Parallax . .	6.1	6.1	6.1	6.2	6.4	6.7	7.0

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

JANUARY.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m
1	21 43 55.56	+11.502	−15 29 42.6	+63.38	2 58.7
2	21 48 30.82	11.436	15 4 10.2	64.32	2 59.3
3	21 53 4.51	11.371	14 38 15.6	65.22	2 59.9
4	21 57 36.64	11.306	14 11 59.7	66.09	3 0.5
5	22 2 7.20	11.241	13 45 23.4	66.93	3 1.1
6	22 6 36.22	+11.177	−13 18 27.4	+67.73	3 1.6
7	22 11 3.69	11.113	12 51 12.7	68.50	3 2.1
8	22 15 29.64	11.050	12 23 40.0	69.23	3 2.6
9	22 19 54.07	10.987	11 55 50.0	69.93	3 3.1
10	22 24 17.01	10.925	11 27 43.6	70.60	3 3.5
11	22 28 38.46	+10.863	−10 59 21.6	+71.23	3 3.9
12	22 32 58.45	10.802	10 30 44.7	71.83	3 4.3
13	22 37 16.98	10.742	10 1 53.9	72.40	3 4.7
14	22 41 34.08	10.683	9 32 49.9	72.93	3 5.1
15	22 45 49.77	10.625	9 3 33.4	73.43	3 5.4
16	22 50 4.07	+10.567	− 8 34 5.3	+73.90	3 5.7
17	22 54 17.01	10.511	8 4 26.3	74.34	3 5.9
18	22 58 28.60	10.455	7 34 37.1	74.75	3 6.2
19	23 2 38.86	10.401	7 4 38.6	75.13	3 6.4
20	23 6 47.82	10.347	6 34 31.5	75.47	3 6.6
21	23 10 55.51	+10.294	− 6 4 16.4	+75.79	3 6.8
22	23 15 1.94	10.242	5 33 54.1	76.07	3 7.0
23	23 19 7.14	10.191	5 3 25.4	76.32	3 7.1
24	23 23 11.12	10.141	4 32 51.0	76.54	3 7.2
25	23 27 13.92	10.092	4 2 11.5	76.73	3 7.3
26	23 31 15.54	+10.043	− 3 31 27.7	+76.90	3 7.4
27	23 35 16.01	9.995	3 0 40.3	77.03	3 7.4
28	23 39 15.34	9.948	2 29 50.1	77.14	3 7.5
29	23 43 13.55	9.902	1 58 57.8	77.21	3 7.5
30	23 47 10.64	9.856	1 28 4.0	77.26	3 7.5
31	23 51 6.63	+ 9.810	− 0 57 9.5	+77.27	3 7.5
32	23 55 1.52	+ 9.765	− 0 26 14.9	+77.26	3 7.4

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.
Semidiameter . .	8.″2	8.″5	8.″7	9.″1	9.″4	9.″8	10.″2
Hor. Parallax . .	8.5	8.8	9.1	9.4	9.8	10.2	10.6

FEBRUARY.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m
1	23 55 1.52	+9.765	− 0 26 14.9	+77.26	3 7.4
2	23 58 55.33	9.719	+ 0 4 38.9	77.21	3 7.4
3	0 2 48.05	9.674	0 35 31.3	77.14	3 7.3
4	0 6 39.69	9.629	1 6 21.4	77.03	3 7.3
5	0 10 30.25	9.584	1 37 8.6	76.90	3 7.2
6	0 14 19.72	+9.539	+ 2 7 52.2	+76.73	3 7.1
7	0 18 8.10	9.493	2 38 31.5	76.54	3 7.0
8	0 21 55.40	9.448	3 9 5.7	76.31	3 6.8
9	0 25 41.60	9.402	3 39 34.2	76.06	3 6.6
10	0 29 26.70	9.356	4 9 56.2	75.77	3 6.4
11	0 33 10.67	+9.309	+ 4 40 10.9	+75.46	3 6.2
12	0 36 53.52	9.262	5 10 17.8	75.11	3 5.9
13	0 40 35.22	9.214	5 40 16.1	74.74	3 5.7
14	0 44 15.77	9.166	6 10 5.1	74.34	3 5.4
15	0 47 55.16	9.117	6 39 44.1	73.91	3 5.1
16	0 51 33.37	+9.067	+ 7 9 12.6	+73.45	3 4.8
17	0 55 10.39	9.017	7 38 29.7	72.97	3 4.5
18	0 58 46.18	8.965	8 7 35.0	72.46	3 4.1
19	1 2 20.72	8.913	8 36 27.8	71.92	3 3.8
20	1 5 53.98	8.859	9 5 7.2	71.36	3 3.4
21	1 9 25.92	+8.804	+ 9 33 32.8	+70.77	3 3.0
22	1 12 56.53	8.747	10 1 44.2	70.16	3 2.5
23	1 16 25.76	8.689	10 29 40.4	69.52	3 2.1
24	1 19 53.57	8.629	10 57 20.9	68.86	3 1.6
25	1 23 19.90	8.566	11 24 45.0	68.16	3 1.1
26	1 26 44.71	+8.501	+11 51 52.2	+67.44	3 0.6
27	1 30 7.93	8.434	12 18 41.7	66.69	3 0.0
28	1 33 29.50	8.364	12 45 13.1	65.92	2 59.4
29	1 36 49.34	8.290	13 11 25.6	65.12	2 58.8
30	1 40 7.38	8.213	13 37 18.6	64.29	2 58.1
31	1 43 23.54	+8.132	+14 2 51.4	+63.42	2 57.4
32	1 46 37.71	+8.048	+14 28 3.2	+62.54	2 56.7

Day of the Month.	5th.	10th.	15th.	20th.	25th.
Semidiameter.	10.″7	11.″2	11.″8	12.″4	13.″2
Hor. Parallax	11.1	11.6	12.2	12.9	13.6

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

MARCH.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	1 36 49.34	+8.290	+13 11 25.6	+65.12	2 58.8
2	1 40 7.38	8.213	13 37 18.6	64.29	2 58.1
3	1 43 23.54	8.132	14 2 51.4	63.43	2 57.4
4	1 46 37.71	8.048	14 28 3.2	62.54	2 56.7
5	1 49 49.80	7.959	14 52 53.5	61.63	2 56.0
6	1 52 59.70	+7.865	+15 17 21.4	+60.69	2 55.2
7	1 56 7.30	7.767	15 41 26.3	59.72	2 54.4
8	1 59 12.48	7.664	16 5 7.5	58.72	2 53.5
9	2 2 15.11	7.555	16 28 24.3	57.69	2 52.6
10	2 5 15.06	7.441	16 51 16.0	56.63	2 51.7
11	2 8 12.19	+7.320	+17 13 41.9	+55.53	2 50.7
12	2 11 6.35	7.193	17 35 41.1	54.40	2 49.7
13	2 13 57.39	7.060	17 57 12.9	53.24	2 48.6
14	2 16 45.16	6.919	18 18 16.4	52.05	2 47.4
15	2 19 29.48	6.772	18 38 51.0	50.83	2 46.2
16	2 22 10.18	+6.618	+18 58 55.9	+49.57	2 44.9
17	2 24 47.09	6.456	19 18 30.3	48.28	2 43.6
18	2 27 20.01	6.286	19 37 33.4	46.96	2 42.2
19	2 29 48.76	6.108	19 56 4.2	45.61	2 40.7
20	2 32 13.14	5.921	20 14 2.2	44.22	2 39.2
21	2 34 32.94	+5.726	+20 31 26.4	+42.79	2 37.6
22	2 36 47.94	5.522	20 48 15.8	41.32	2 35.9
23	2 38 57.92	5.308	21 4 29.4	39.81	2 34.1
24	2 41 2.66	5.085	21 20 6.3	38.26	2 32.3
25	2 43 1.91	4.851	21 35 5.4	36.66	2 30.4
26	2 44 55.42	+4.607	+21 49 25.7	+35.02	2 28.3
27	2 46 42.94	4.352	22 3 6.0	33.33	2 26.1
28	2 48 24.21	4.086	22 16 5.1	31.59	2 23.8
29	2 49 58.95	3.808	22 28 21.6	29.78	2 21.4
30	2 51 26.91	3.519	22 39 54.0	27.91	2 18.9
31	2 52 47.80	+3.219	+22 50 40.9	+25.98	2 16.3
32	2 54 1.33	+2.907	+23 0 40.8	+23.99	2 13.6

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.
Semidiameter . .	14″.0	14″.9	15″.9	17″.1	18″.4	19″.9
Hor. Parallax . .	14.5	15.4	16.5	17.7	19.1	20.6

APRIL.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	2 54 1.33	+2.907	+23 0 40.8	+23.99	2 13.6
2	2 55 7.23	2.583	23 9 51.9	21.92	2 10.8
3	2 56 5.21	2.247	23 18 12.6	19.78	2 7.8
4	2 56 55.00	1.900	23 25 40.8	17.56	2 4.7
5	2 57 36.35	1.542	23 32 14.7	15.25	2 1.4
6	2 58 8.99	+1.175	+23 37 52.0	+12.85	1 58.0
7	2 58 32.70	0.799	23 42 30.7	10.36	1 54.4
8	2 58 47.27	0.414	23 46 8.4	7.77	1 50.7
9	2 58 52.51	+0.022	23 48 43.0	5.08	1 46.8
10	2 58 48.27	−0.376	23 50 12.0	+ 2.31	1 42.8
11	2 58 34.45	−0.777	+23 50 33.3	− 0.56	1 38.7
12	2 58 10.98	1.179	23 49 44.5	3.52	1 34.4
13	2 57 37.85	1.581	23 47 43.6	6.58	1 29.9
14	2 56 55.09	1.981	23 44 28.3	9.71	1 25.3
15	2 56 2.80	2.375	23 39 56.8	12.92	1 20.5
16	2 55 1.15	−2.761	+23 34 7.3	−16.20	1 15.5
17	2 53 50.37	3.135	23 26 58.8	19.53	1 10.4
18	2 52 30.79	3.494	23 18 29.9	22.89	1 5.1
19	2 51 2.79	3.836	23 8 40.0	26.26	0 59.7
20	2 49 26.83	4.157	22 57 29.2	29.63	0 54.2
21	2 47 43.44	−4.454	+22 44 57.8	−32.97	0 48.5
22	2 45 53.23	4.728	22 31 6.9	36.25	0 42.7
23	2 43 56.86	4.967	22 15 58.1	39.45	0 36.8
24	2 41 55.06	5.177	21 59 33.8	42.54	0 30.9
25	2 39 48.63	5.354	21 41 57.1	45.48	0 24.9
26	2 37 38.39	−5.493	+21 23 11.6	−48.26	0 18.8
27	2 35 25.27	5.595	21 3 22.1	50.84	0 12.7
28	2 33 10.14	5.659	20 42 33.6	53.17	0 6.5
29	2 30 53.93	5.684	20 20 52.0	55.25	0 0.3 23 54.1
30	2 28 37.58	5.671	19 58 23.7	57.05	23 48.0
31	2 26 22.01	−5.620	+19 35 15.9	−58.54	23 41.9
32	2 24 8.14	−5.530	+19 11 36.0	−59.72	23 35.8

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.
Semidiameter . .	21″.5	23″.3	25″.2	26″.9	28″.5	29″.5
Hor. Parallax . .	22.3	24.1	26.0	27.9	29.5	30.6

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

MAY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	2 26 22.01	−5.690	+19 35 15.9	−58.54	23 41.9
2	2 24 8.14	5.530	19 11 36.0	59.72	23 35.8
3	2 21 56.86	5.404	18 47 31.8	60.57	23 29.7
4	2 19 49.02	5.243	18 23 11.1	61.09	23 23.7
5	2 17 45.46	5.049	17 58 42.2	61.26	23 17.8
6	2 15 46.92	−4.828	+17 34 13.1	−61.10	23 12.0
7	2 13 54.09	4.572	17 9 51.8	60.60	23 6.3
8	2 12 7.63	4.295	16 45 46.2	59.80	23 0.7
9	2 10 28.11	3.994	16 22 3.7	58.69	22 55.2
10	2 8 56.04	3.675	15 58 51.2	57.30	22 49.9
11	2 7 31.83	−3.339	+15 36 15.3	−55.65	22 44.7
12	2 6 15.86	2.989	15 14 22.0	53.76	22 39.6
13	2 5 8.44	2.628	14 53 16.6	51.66	22 34.7
14	2 4 9.78	2.259	14 33 3.9	49.37	22 29.9
15	2 3 20.04	1.885	14 13 47.9	46.93	22 25.3
16	2 2 39.33	−1.507	+13 55 32.1	−44.36	22 20.9
17	2 2 7.72	1.128	13 38 19.4	41.68	22 16.6
18	2 1 45.19	0.750	13 22 12.0	38.92	22 12.5
19	2 1 31.69	0.375	13 7 11.4	36.11	22 8.5
20	2 1 27.14	−0.004	12 53 18.8	33.26	22 4.6
21	2 1 31.44	+0.362	+12 40 35.0	−30.39	22 0.9
22	2 1 44.43	0.720	12 29 0.0	27.52	21 57.3
23	2 2 5.93	1.071	12 18 33.7	24.67	21 53.8
24	2 2 35.73	1.413	12 9 15.4	21.86	21 50.5
25	2 3 13.65	1.747	12 1 4.2	19.09	21 47.3
26	2 3 59.46	+2.071	+11 53 59.0	−16.36	21 44.3
27	2 4 52.96	2.386	11 47 58.3	13.70	21 41.4
28	2 5 53.90	2.691	11 43 0.6	11.11	21 38.6
29	2 7 2.03	2.986	11 39 4.2	8.59	21 35.9
30	2 8 17.13	3.271	11 36 7.4	6.15	21 33.2
31	2 9 38.96	+3.547	+11 34 8.2	− 3.79	21 30.7
32	2 11 7.31	+3.814	+11 33 4.6	− 1.52	21 28.4

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.
Semidiameter . .	29.8″	29.4″	28.2″	26.6″	24.8″	22.9″	21.1″
Hor. Parallax . .	30.9	30.4	29.2	27.6	25.7	23.7	21.9

JUNE.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	2 11 7.31	+3.814	+11 33 4.6	− 1.52	21 28.4
2	2 12 41.95	4.072	11 32 54.6	+ 0.67	21 26.2
3	2 14 22.68	4.321	11 33 36.1	2.78	21 24.0
4	2 16 9.29	4.562	11 35 7.0	4.80	21 21.9
5	2 18 1.59	4.795	11 37 25.6	6.74	21 19.9
6	2 19 59.38	+5.020	+11 40 30.2	+ 8.59	21 18.0
7	2 22 2.47	5.238	11 44 18.1	10.36	21 16.2
8	2 24 10.71	5.448	11 48 47.3	12.05	21 14.5
9	2 26 23.92	5.652	11 53 56.0	13.66	21 12.8
10	2 28 41.95	5.849	11 59 42.3	15.18	21 11.2
11	2 31 4.64	+6.040	+12 6 4.3	+16.63	21 9.7
12	2 33 31.84	6.225	12 13 0.1	18.00	21 8.3
13	2 36 3.42	6.405	12 20 27.9	19.30	21 6.9
14	2 38 39.24	6.579	12 28 25.7	20.51	21 5.6
15	2 41 19.17	6.748	12 36 51.9	21.65	21 4.4
16	2 44 3.10	+6.912	+12 45 44.5	+22.72	21 3.3
17	2 46 50.90	7.071	12 55 1.9	23.72	21 2.2
18	2 49 42.45	7.225	13 4 42.3	24.65	21 1.2
19	2 52 37.64	7.374	13 14 44.2	25.50	21 0.2
20	2 55 36.37	7.519	13 25 5.7	26.28	20 59.3
21	2 58 38.53	+7.660	+13 35 45.3	+27.00	20 58.4
22	3 1 44.02	7.797	13 46 41.3	27.66	20 57.6
23	3 4 52.74	7.930	13 57 52.2	28.25	20 56.8
24	3 8 4.60	8.059	14 9 16.5	28.77	20 56.1
25	3 11 19.53	8.185	14 20 52.7	29.23	20 55.5
26	3 14 37.43	+8.307	+14 32 39.2	+29.63	20 54.9
27	3 17 58.23	8.426	14 44 34.7	29.98	20 54.4
28	3 21 21.86	8.542	14 56 37.8	30.27	20 53.9
29	3 24 48.25	8.656	15 8 46.9	30.50	20 53.4
30	3 28 17.33	8.767	15 21 1.2	30.68	20 53.0
31	3 31 49.04	+8.875	+15 33 19.1	+30.80	20 52.6
32	3 35 23.33	+8.981	+15 45 39.3	+30.88	20 52.3

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.
Semidiameter . .	19.5″	18.0″	16.7″	15.5″	14.5″	13.6″
Hor. Parallax . .	20.2	18.6	17.3	16.1	15.0	14.0

NOTE.—The sign + indicates north declinations: the sign — indicates south declinations.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	3 31 49.04	+ 8.875	+15 33 19.1	+30.80	20 52.6	1	5 39 6.03	+11.389	+20 46 24.7	+13.57	20 58.4
2	3 35 23.33	8.981	15 45 39.3	30.88	20 52.3	2	5 43 40.00	11.442	20 51 37.2	12.47	20 59.1
3	3 39 0.14	9.085	15 58 0.6	30.90	20 52.0	3	5 48 15.23	11.493	20 56 23.1	11.35	20 59.8
4	3 42 39.42	9.187	16 10 21.9	30.87	20 51.7	4	5 52 51.67	11.543	21 0 41.8	10.20	21 0.5
5	3 46 21.14	9.288	16 22 41.9	30.79	20 51.5	5	5 57 29.29	11.591	21 4 32.7	9.04	21 1.2
6	3 50 5.24	+ 9.387	+16 34 59.6	+30.67	20 51.3	6	6 2 8.03	+11.637	+21 7 55.4	+ 7.85	21 1.9
7	3 53 51.69	9.484	16 47 13.9	30.51	20 51.2	7	6 6 47.87	11.681	21 10 49.3	6.64	21 2.6
8	3 57 40.44	9.579	16 59 23.6	30.30	20 51.1	8	6 11 28.75	11.724	21 13 14.0	5.41	21 3.4
9	4 1 31.46	9.673	17 11 27.7	30.04	20 51.1	9	6 16 10.64	11.765	21 15 9.1	4.17	21 4.2
10	4 5 24.72	9.765	17 23 25.2	29.74	20 51.0	10	6 20 53.48	11.804	21 16 34.1	2.91	21 5.0
11	4 9 20.17	+ 9.856	+17 35 15.1	+29.40	20 51.0	11	6 25 37.24	+11.841	+21 17 28.6	+ 1.63	21 5.8
12	4 13 17.79	9.945	17 46 56.2	29.02	20 51.1	12	6 30 21.85	11.876	21 17 52.3	+ 0.34	21 6.6
13	4 17 17.54	10.033	17 58 27.5	28.60	20 51.1	13	6 35 7.28	11.909	21 17 44.7	− 0.97	21 7.4
14	4 21 19.38	10.120	18 9 48.2	28.13	20 51.2	14	6 39 53.47	11.940	21 17 5.5	2.29	21 8.3
15	4 25 23.28	10.205	18 20 57.3	27.62	20 51.4	15	6 44 40.38	11.969	21 15 54.5	3.63	21 9.1
16	4 29 29.21	+10.289	+18 31 53.8	+27.07	20 51.6	16	6 49 27.96	+11.996	+21 14 11.4	− 4.97	21 10.0
17	4 33 37.12	10.371	18 42 36.7	26.49	20 51.8	17	6 54 16.15	12.021	21 11 55.8	6.33	21 10.8
18	4 37 46.98	10.451	18 53 5.1	25.87	20 52.0	18	6 59 4.90	12.043	21 9 7.6	7.69	21 11.7
19	4 41 58.75	10.530	19 3 18.2	25.21	20 52.3	19	7 3 54.16	12.063	21 5 46.6	9.06	21 12.6
20	4 46 12.39	10.607	19 13 14.9	24.51	20 52.6	20	7 8 43.88	12.081	21 1 52.6	10.44	21 13.5
21	4 50 27.85	+10.682	+19 22 54.4	+23.78	20 53.0	21	7 13 34.01	+12.097	+20 57 25.5	−11.82	21 14.4
22	4 54 45.09	10.755	19 32 15.9	23.01	20 53.4	22	7 18 24.48	12.110	20 52 25.2	13.21	21 15.3
23	4 59 4.07	10.827	19 41 18.6	22.21	20 53.8	23	7 23 15.25	12.121	20 46 51.5	14.60	21 16.2
24	5 3 24.76	10.897	19 50 1.6	21.37	20 54.2	24	7 28 6.27	12.130	20 40 44.4	15.99	21 17.1
25	5 7 47.10	10.965	19 58 24.1	20.50	20 54.7	25	7 32 57.47	12.137	20 34 3.9	17.38	21 18.0
26	5 12 11.05	+11.031	+20 6 25.2	+19.60	20 55.2	26	7 37 48.82	+12.142	+20 26 50.0	−18.78	21 18.9
27	5 16 36.56	11.095	20 14 4.3	18.66	20 55.7	27	7 42 40.26	12.145	20 19 2.7	20.17	21 19.8
28	5 21 3.59	11.157	20 21 20.6	17.70	20 56.2	28	7 47 31.75	12.146	20 10 42.2	21.55	21 20.8
29	5 25 32.09	11.218	20 28 13.5	16.71	20 56.7	29	7 52 23.25	12.145	20 1 48.5	22.93	21 21.7
30	5 30 2.03	11.277	20 34 42.2	15.69	20 57.2	30	7 57 14.71	12.143	19 52 21.7	24.31	21 22.6
31	5 34 33.36	+11.334	+20 40 46.1	+14.64	20 57.8	31	8 2 6.09	+12 139	+19 42 21.9	−25.68	21 23.5
32	5 39 6.03	+11.389	+20 46 24.7	+13.57	20 58.4	32	8 6 57.35	+12.133	+19 31 49.3	−27.04	21 24.4

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.	Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
Semidiameter . .	12″.8	12″.0	11″.4	10″.8	10″.3	9″.8	Semidiameter . .	9″.4	9″.1	8″.7	8″.4	8″.1	7″.8
Hor. Parallax . .	13.2	12.5	11.8	11.2	10.7	10.2	Hor. Parallax . .	9.8	9.4	9.0	8.7	8.4	8.1

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign − indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

Day of Month.	SEPTEMBER.					Day of Month.	OCTOBER.				
	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	8 6 57.35	+12.133	+19 31 49.3	−27.04	21 24.4	1	10 29 38.35	+11.574	+10 27 50.0	−60.72	21 48.7
2	8 11 48.45	12.126	19 20 44.0	28.39	21 25.3	2	10 34 15.87	11.554	10 3 23.2	61.50	21 49.4
3	8 16 39.36	12.117	19 9 6.3	29.74	21 26.2	3	10 38 52.93	11.534	9 38 38.1	62.25	21 50.0
4	8 21 30.04	12.107	18 56 56.4	31.07	21 27.1	4	10 43 29.52	11.515	9 13 35.2	62.98	21 50.7
5	8 26 20.47	12.096	18 44 14.6	32.40	21 28.0	5	10 48 5.67	11.497	8 48 15.3	63.68	21 51.3
6	8 31 10.61	+12.084	+18 31 1.2	−33.72	21 28.9	6	10 52 41.40	+11.480	+ 8 22 38.9	−64.35	21 51.9
7	8 36 0.45	12.070	18 17 16.4	35.02	21 29.8	7	10 57 16.73	11.464	7 56 46.8	64.99	21 52.5
8	8 40 49.95	12.055	18 3 0.4	36.31	21 30.7	8	11 1 51.69	11.449	7 30 39.5	65.61	21 53.2
9	8 45 39.09	12.040	17 48 13.6	37.58	21 31.5	9	11 6 26.30	11.435	7 4 17.7	66.20	21 53.8
10	8 50 27.88	12.023	17 32 56.4	38.84	21 32.4	10	11 11 0.59	11.422	6 37 42.1	66.76	21 54.5
11	8 55 16.21	+12.006	+17 17 9.1	−40.09	21 33.2	11	11 15 34.58	+11.410	+ 6 10 53.2	−67.30	21 55.1
12	9 0 4.14	11.988	17 0 52.1	41.32	21 34.1	12	11 20 8.31	11.400	5 43 51.8	67.81	21 55.7
13	9 4 51.64	11.969	16 44 5.8	42.54	21 34.9	13	11 24 41.79	11.390	5 16 38.6	68.29	21 56.3
14	9 9 38.68	11.950	16 26 50.5	43.74	21 35.8	14	11 29 15.06	11.382	4 49 14.2	68.74	21 56.9
15	9 14 25.26	11.930	16 9 6.8	44.91	21 36.6	15	11 33 48.14	11.375	4 21 39.3	69.16	21 57.5
16	9 19 11.34	+11.909	+15 50 55.0	−46.07	21 37.4	16	11 38 21.07	+11.369	+ 3 53 54.8	−69.56	21 58.1
17	9 23 56.92	11.888	15 32 15.7	47.21	21 38.2	17	11 42 53.87	11.364	3 26 1.1	69.92	21 58.8
18	9 28 41.98	11.866	15 13 9.3	48.33	21 39.0	18	11 47 26.56	11.361	2 57 59.0	70.26	21 59.4
19	9 33 26.51	11.844	14 53 36.4	49.42	21 39.8	19	11 51 59.19	11.359	2 29 49.1	70.56	22 0.0
20	9 38 10.51	11.822	14 33 37.4	50.49	21 40.6	20	11 56 31.79	11.358	2 1 32.4	70.83	22 0.6
21	9 42 53.96	+11.799	+14 13 12.9	−51.55	21 41.4	21	12 1 4.37	+11.358	+ 1 33 9.6	−71.07	22 1.2
22	9 47 36.87	11.776	13 52 23.4	52.58	21 42.2	22	12 5 36.98	11.359	1 4 41.3	71.29	22 1.8
23	9 52 19.23	11.753	13 31 9.5	53.58	21 42.9	23	12 10 9.64	11.362	0 36 8.2	71.47	22 2.4
24	9 57 1.03	11.730	13 9 31.7	54.56	21 43.7	24	12 14 42.38	11.366	+ 0 7 31.1	71.62	22 3.0
25	10 1 42.28	11.707	12 47 30.7	55.52	21 44.4	25	12 19 15.24	11.372	− 0 21 9.4	71.74	22 3.6
26	10 6 22.98	+11.684	+12 25 7.0	−56.45	21 45.2	26	12 23 48.24	+11.379	− 0 49 52.4	−71.82	22 4.2
27	10 11 3.12	11.661	12 2 21.3	57.36	21 45.9	27	12 28 21.42	11.387	1 18 37.0	71.88	22 4.8
28	10 15 42.72	11.639	11 39 14.1	58.24	21 46.6	28	12 32 54.83	11.397	1 47 22.7	71.91	22 5.4
29	10 20 21.78	11.617	11 15 46.1	59.09	21 47.3	29	12 37 28.49	11.408	2 16 8.7	71.91	22 6.0
30	10 25 0.32	11.595	10 51 57.8	59.92	21 48.0	30	12 42 2.44	11.421	2 44 54.2	71.88	22 6.6
31	10 29 38.35	+11.574	+10 27 50.0	−60.72	21 48.7	31	12 46 36.72	+11.435	− 3 13 38.6	−71.82	22 7.3
32	10 34 15.87	+11.554	+10 3 23.2	−61.50	21 49.4	32	12 51 11.35	+11.451	− 3 42 21.0	−71.72	22 8.0

Day of the Month.	3d.	8th.	13th.	18th.	23d.	28th.	Day of the Month.	3d.	8th.	13th.	18th.	23d.	28th.
	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter . .	7.6	7.4	7.2	7.0	6.8	6.7	Semidiameter . .	6.5	6.4	6.2	6.1	6.0	5.9
Hor. Parallax . .	7.9	7.6	7.4	7.2	7.1	6.9	Hor. Parallax . .	6.7	6.6	6.5	6.4	6.2	6.1

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	12 51 11.35	+11.451	− 3 42 21.0	−71.72	22 8.0
2	12 55 46.38	11.468	4 11 0.7	71.59	22 8.7
3	13 0 21.84	11.487	4 39 37.0	71.43	22 9.4
4	13 4 57.77	11.508	5 8 9.1	71.24	22 10.1
5	13 9 34.22	11.530	5 36 36.3	71.02	22 10.7
6	13 14 11.21	+11.554	− 6 4 57.9	−70.77	22 11.4
7	13 18 48.80	11.579	6 33 13.0	70.49	22 12.0
8	13 23 27.00	11.605	7 1 20.9	70.17	22 12.7
9	13 28 5.86	11.633	7 29 20.8	69.83	22 13.4
10	13 32 45.42	11.663	7 57 12.1	69.45	22 14.1
11	13 37 25.71	+11.694	− 8 24 53.9	−69.04	22 14.8
12	13 42 6.76	11.727	8 52 25.4	68.60	22 15.6
13	13 46 48.61	11.761	9 19 45.9	68.12	22 16.3
14	13 51 31.28	11.796	9 46 54.6	67.61	22 17.1
15	13 56 14.82	11.832	10 13 50.8	67.07	22 17.9
16	14 0 59.25	+11.870	−10 40 33.5	−66.49	22 18.7
17	14 5 44.60	11.909	11 7 2.1	65.88	22 19.5
18	14 10 30.89	11.949	11 33 15.7	65.24	22 20.4
19	14 15 18.15	11.990	11 59 13.4	64.56	22 21.3
20	14 20 6.40	12.032	12 24 54.5	63.85	22 22.2
21	14 24 55.68	+12.075	−12 50 18.1	−63.11	22 23.1
22	14 29 45.99	12.118	13 15 23.5	62.33	22 24.0
23	14 34 37.37	12.163	13 40 9.8	61.52	22 24.9
24	14 39 29.82	12.208	14 4 36.2	60.67	22 25.9
25	14 44 23.37	12.254	14 28 41.8	59.79	22 26.8
26	14 49 18.02	+12.301	−14 52 25.8	−58.88	22 27.8
27	14 54 13.80	12.348	15 15 47.6	57.93	22 28.8
28	14 59 10.71	12.395	15 38 46.3	56.95	22 29.8
29	15 4 8.78	12.443	16 1 21.0	55.94	22 30.8
30	15 9 8.01	12.492	16 23 31.0	54.89	22 31.9
31	15 14 8.42	+12.541	−16 45 15.3	−53.81	22 33.0
32	15 19 10.01	+12.591	−17 6 33.4	−52.70	22 34.1

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.
Semidiameter . . .	5″.8	5″.7	5″.7	5″.6	5″.5	5″.5
Hor. Parallax . . .	6.0	5.9	5.9	5.8	5.7	5.6

DECEMBER.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	15 14 8.42	+12.541	−16 45 15.3	−53.81	22 33.0
2	15 19 10.01	12.591	17 6 33.4	52.70	22 34.1
3	15 24 12.78	12.640	17 27 24.5	51.56	22 35.2
4	15 29 16.74	12.690	17 47 47.7	50.38	22 36.4
5	15 34 21.90	12.739	18 7 42.4	49.17	22 37.6
6	15 39 28.24	+12.789	−18 27 7.6	−47.93	22 38.8
7	15 44 35.78	12.838	18 46 2.7	46.66	22 40 0
8	15 49 44.50	12.888	19 4 27.1	45.36	22 41.2
9	15 54 54.40	12.937	19 22 19.9	44.03	22 42.4
10	16 0 5.47	12.985	19 39 40.4	42.67	22 43.7
11	16 5 17.70	+13.033	−19 56 28.0	−41.28	22 45.0
12	16 10 31.07	13.080	20 12 42.0	39.87	22 46.3
13	16 15 45.56	13.126	20 28 21.6	38.43	22 47.6
14	16 21 1.15	13.172	20 43 26.3	36.96	22 48.9
15	16 26 17.82	13.217	20 57 55.3	35.46	22 50.2
16	16 31 35.54	+13.260	−21 11 47.9	−33.93	22 51.6
17	16 36 54.27	13.301	21 25 3.6	32.38	22 53.0
18	16 42 13.97	13.341	21 37 41.9	30.80	22 54.4
19	16 47 34.63	13.380	21 49 42.1	29.20	22 55.8
20	16 52 56.19	13.417	22 1 3.6	27.58	22 57.3
21	16 58 18.62	+13.452	−22 11 46.0	−25.94	22 58.7
22	17 3 41.87	13.485	22 21 48.8	24.28	23 0.2
23	17 9 5.89	13.516	22 31 11.3	22.59	23 1.6
24	17 14 30.63	13.545	22 39 53.2	20.89	23 3.1
25	17 19 56.04	13.572	22 47 54.0	19.17	23 4.6
26	17 25 22.07	+13.597	−22 55 13.4	−17.44	23 6.1
27	17 30 48.66	13.619	23 1 51.0	15.69	23 7.6
28	17 36 15.76	13.639	23 7 46.5	13.93	23 9.1
29	17 41 43.31	13.657	23 12 59.6	12.15	23 10.6
30	17 47 11.26	13.672	23 17 30.0	10.37	23 12.2
31	17 52 39.54	+13.685	−23 21 17.4	− 8.58	23 13.7
32	17 58 8.10	+13.695	−23 24 21.8	− 6.78	23 15.3

Day of the Month.	2d.	th.	12th.	17th.	22d.	27th.	32d.
Semidiameter . .	5″.4	5″.3	5″.3	5″.3	5″.2	5″.2	5″.1
Hor. Parallax . .	5.6	5.5	5.5	5.4	5.4	5.4	5.3

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

JANUARY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	21 45 32.18	+7.579	−14 40 17.3	+40.30	3 0.1
2	21 48 33.86	7.561	14 24 6.0	40.64	2 59.2
3	21 51 35.12	7.544	14 7 46.4	40.98	2 58.3
4	21 54 35.95	7.526	13 51 18.9	41.31	2 57.4
5	21 57 36.36	7.508	13 34 43.6	41.63	2 56.5
6	22 0 36.34	+7.490	−13 18 0.7	+41.94	2 55.5
7	22 3 35.89	7.473	13 1 10.5	42.24	2 54.5
8	22 6 35.02	7.455	12 44 13.2	42.53	2 53.6
9	22 9 33.74	7.437	12 27 8.9	42.81	2 52.6
10	22 12 32.04	7.420	12 9 57.9	43.09	2 51.7
11	22 15 29.92	+7.403	−11 52 40.4	+43.36	2 50.7
12	22 18 27.40	7.386	11 35 16.7	43.62	2 49.7
13	22 21 24.47	7.369	11 17 46.9	43.87	2 48.7
14	22 24 21.14	7.353	11 0 11.3	44.10	2 47.7
15	22 27 17.42	7.337	10 42 30.0	44.33	2 46.7
16	22 30 13.31	+7.321	−10 24 43.3	+44.55	2 45.7
17	22 33 8.82	7.305	10 6 51.4	44.76	2 44.7
18	22 36 3.96	7.290	9 48 54.5	44.97	2 43.7
19	22 38 58.73	7.275	9 30 52.7	45.17	2 42.6
20	22 41 53.14	7.260	9 12 46.3	45.36	2 41.6
21	22 44 47.21	+7.246	− 8 54 35.4	+45.54	2 40.5
22	22 47 40.94	7.232	8 36 20.3	45.71	2 39.4
23	22 50 34.33	7.218	8 18 1.1	45.88	2 38.4
24	22 53 27.41	7.205	7 59 38.0	46.04	2 37.3
25	22 56 20.17	7.192	7 41 11.3	46.19	2 36.3
26	22 59 12.62	+7.179	− 7 22 41.0	+46.33	2 35.2
27	23 2 4.77	7.167	7 4 7.5	46.46	2 34.2
28	23 4 56.63	7.155	6 45 30.9	46.58	2 33.1
29	23 7 48.21	7.143	6 26 51.4	46.70	2 32.0
30	23 10 39.50	7.131	6 8 9.2	46.81	2 30.9
31	23 13 30.53	+7.120	− 5 49 24.5	+46.90	2 29.8
32	23 16 21.28	+7.109	− 5 30 37.6	+46.99	2 28.7

FEBRUARY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	23 16 21.28	+7.109	−5 30 37.6	+46.99	2 28.7
2	23 19 11.77	7.098	5 11 48.6	47.08	2 27.6
3	23 22 2.01	7.088	4 52 57.6	47.15	2 26.5
4	23 24 52.00	7.078	4 34 5.0	47.22	2 25.4
5	23 27 41.75	7.068	4 15 10.9	47.28	2 24.3
6	23 30 31.25	+7.058	−3 56 15.5	+47.33	2 23.2
7	23 33 20.53	7.049	3 37 19.1	47.37	2 22.0
8	23 36 9.59	7.040	3 18 21.8	47.40	2 20.9
9	23 38 58.43	7.031	2 59 23.8	47.42	2 19.7
10	23 41 47.06	7.022	2 40 25.3	47.43	2 18.6
11	23 44 35.48	+7.014	−2 21 26.5	+47.43	2 17.5
12	23 47 23.71	7.006	2 2 27.6	47.43	2 16.3
13	23 50 11.76	6.998	1 43 28.7	47.43	2 15.2
14	23 52 59.64	6.991	1 24 30.1	47.43	2 14.0
15	23 55 47.35	6.984	1 5 32.0	47.41	2 12.9
16	23 58 34.90	+6.978	−0 46 34.4	+47.38	2 11.8
17	0 1 22.31	6.972	0 27 37.5	47.35	2 10.6
18	0 4 9.58	6.967	−0 8 41.6	47.31	2 9.5
19	0 6 56.73	6.962	+0 10 13.2	47.26	2 8.3
20	0 9 43.76	6.957	0 29 6.7	47.20	2 7.2
21	0 12 30.68	+6.953	+0 47 58.8	+47.14	2 6.1
22	0 15 17.52	6.949	1 6 49.4	47.07	2 4.9
23	0 18 4.26	6.946	1 25 38.1	46.99	2 3.7
24	0 20 50.92	6.943	1 44 25.0	46.91	2 2.6
25	0 23 37.51	6.940	2 3 9.7	46.82	2 1.4
26	0 26 24.04	+6.938	+2 21 52.2	+46.72	2 0.2
27	0 29 10.51	6.936	2 40 32.3	46.62	1 59.0
28	0 31 56.93	6.934	2 59 9.8	46.51	1 57.8
29	0 34 43.32	6.932	3 17 44.5	46.39	1 56.6
30	0 37 29.67	6.931	3 36 16.3	46.26	1 55.5
31	0 40 15.99	+6.930	+3 54 45.0	+46.13	1 54.3
32	0 43 2.29	+6.929	+4 13 10.4	+45.99	1 53.1

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.
Semidiameter . .	2″.6	2″.6	2″.5	2″.5	2″.5	2″.4	2″.4
Hor. Parallax . .	4.5	4.5	4.4	4.4	4.3	4.3	4.2

Day of the Month.	5th.	10th.	15th.	20th.	25th.
Semidiameter.	2″.4	2″.4	2″.3	2″.3	2″.3
Hor. Parallax	4.2	4.1	4.1	4.1	4.0

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

MARCH.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	0 34 43.32	+6.932	+ 3 17 44.5	+46.39	1 56.6
2	0 37 29.67	6.931	3 36 16.3	46.26	1 55.5
3	0 40 15.99	6.930	3 54 45.0	46.13	1 54.3
4	0 43 2.29	6.929	4 13 10.4	45.99	1 53.1
5	0 45 48.57	6.928	4 31 32.4	45.84	1 52.0
6	0 48 34.84	+6.928	+ 4 49 50.8	+45.68	1 50.8
7	0 51 21.10	6.928	5 8 5.3	45.52	1 49.7
8	0 54 7.36	6.928	5 26 15.9	45.35	1 48.5
9	0 56 53.63	6.928	5 44 22.3	45.17	1 47.3
10	0 59 39.92	6.929	6 2 24.4	44.99	1 46.1
11	1 2 26.22	+6.930	+ 6 20 22.0	+44.80	1 44.9
12	1 5 12.55	6.931	6 38 15 2	44.61	1 43.8
13	1 7 58.91	6.933	6 56 3.4	44.41	1 42.6
14	1 10 45.31	6.935	7 13 46.9	44.20	1 41.5
15	1 13 31.76	6.937	7 31 25.3	43.99	1 40.3
16	1 16 18.27	+6.939	+ 7 48 58.4	+43.77	1 39.2
17	1 19 4.84	6.942	8 6 26.2	43.54	1 38.0
18	1 21 51.48	6.945	8 23 48.4	43.31	1 36.8
19	1 24 38.20	6.949	8 41 5.1	43.07	1 35.7
20	1 27 25.01	6.953	8 58 15.9	42.83	1 34.5
21	1 30 11.91	+6.957	+ 9 15 20.9	+42.58	1 33.4
22	1 32 58.92	6.961	9 32 19.8	42.33	1 32.2
23	1 35 46.03	6.966	9 49 12.6	42.07	1 31.0
24	1 38 33.26	6.971	10 5 59.0	41.80	1 29.8
25	1 41 20.62	6.976	10 22 39.1	41.53	1 28.7
26	1 44 8.11	+6.981	+10 39 12.5	+41.25	1 27.5
27	1 46 55.73	6.987	10 55 39.2	40.97	1 26.4
28	1 49 43.48	6.993	11 11 59.1	40.68	1 25.3
29	1 52 31.38	6.999	11 28 12.0	40.39	1 24.1
30	1 55 19.42	7.005	11 44 17.7	40.09	1 23.0
31	1 58 7.61	+7.011	+12 0 16.2	+39.78	1 21.8
32	2 0 55.96	+7.017	+12 16 7.3	+39.47	1 20.7

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.
Semidiameter . .	2″.3	2″.2	2″.2	2″.2	2″.2	2″.2
Hor. Parallax . .	4.0	3.9	3.9	3.8	3.8	3.8

APRIL.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	2 0 55.96	+7.017	+12 16 7.3	+39.47	1 20.7
2	2 3 44.46	7.024	12 31 50.9	39.15	1 19.5
3	2 6 33.12	7.030	12 47 26.7	38.83	1 18.4
4	2 9 21.93	7.037	13 2 54.7	38.50	1 17.3
5	2 12 10.91	7.044	13 18 14.7	38.16	1 16.2
6	2 15 0.05	+7.051	+13 33 26.7	+37.82	1 15.1
7	2 17 49.36	7.058	13 48 30.4	37.48	1 13.9
8	2 20 38.84	7.065	14 3 25.7	37.13	1 12.8
9	2 23 28.48	7.072	14 18 12.5	36.77	1 11.7
10	2 26 18.30	7.079	14 32 50.7	36.41	1 10.6
11	2 29 8.29	+7.087	+14 47 20.2	+36.04	1 9.5
12	2 31 58.46	7.094	15 1 40.8	35.67	1 8.4
13	2 34 48.82	7.102	15 15 52.4	35.29	1 7.3
14	2 37 39.36	7.110	15 29 54.8	34.91	1 6.2
15	2 40 30.09	7.118	15 43 48.1	34.53	1 5.1
16	2 43 21.00	+7.126	+15 57 32.1	+34.14	1 4.0
17	2 46 12.11	7.134	16 11 6.6	33.74	1 2.9
18	2 49 3.42	7.142	16 24 31.6	33.34	1 1.8
19	2 51 54.94	7.150	16 37 47.0	32.94	1 0.7
20	2 54 46.66	7.159	16 50 52.7	32.53	0 59.6
21	2 57 38.58	+7.167	+17 3 48.6	+32.12	0 58.6
22	3 0 30.70	7.176	17 16 34.5	31.70	0 57.5
23	3 3 23.02	7.185	17 29 10.4	31.28	0 56.4
24	3 6 15.56	7.194	17 41 36.1	30.86	0 55.4
25	3 9 8.30	7.202	17 53 51.7	30.43	0 54.3
26	3 12 1.25	+7.210	+18 5 56.9	+29.99	0 53.3
27	3 14 54.40	7.219	18 17 51.7	29.56	0 52.2
28	3 17 47.76	7.228	18 29 36.0	29.12	0 51.1
29	3 20 41.32	7.236	18 41 9.7	28.68	0 50.0
30	3 23 35.07	7.244	18 52 32.6	28.23	0 49.0
31	3 26 29.01	+7.252	+19 3 44.7	+27.78	0 48.0
32	3 29 23.15	+7.260	+19 14 45.8	+27.32	0 46.9

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.
Semidiameter . .	2″.1	2″.1	2″.1	2″.1	2″.1	2″.1
Hor. Parallax . .	3.7	3.7	3.7	3.7	3.6	3.6

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

MAY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	3 26 29.01	+7.252	+19 3 44.7	+27.78	0 48.0
2	3 29 23.15	7.260	19 14 45.8	27.32	0 46.9
3	3 32 17.47	7.268	19 25 36.0	26.86	0 45.9
4	3 35 11.98	7.275	19 36 15.0	26.39	0 44.9
5	3 38 6.66	7.282	19 46 42.9	25.92	0 43.9
6	3 41 1.51	+7.289	+19 56 59.5	+25.45	0 42.9
7	3 43 56.54	7.296	20 7 4.6	24.97	0 41.8
8	3 46 51.73	7.303	20 16 58.3	24.49	0 40.8
9	3 49 47.09	7.310	20 26 40.4	24.01	0 39.8
10	3 52 42.60	7.317	20 36 11.0	23.53	0 38.8
11	3 55 38.27	+7.323	+20 45 29.8	+23.04	0 37.8
12	3 58 34.09	7.329	20 54 36.9	22.55	0 36.8
13	4 1 30.07	7.335	21 3 32.2	22.06	0 35.8
14	4 4 26.19	7.341	21 12 15.6	21.56	0 34.8
15	4 7 22.45	7.347	21 20 47.1	21.06	0 33.8
16	4 10 18.85	+7.353	+21 29 6.6	+20.56	0 32.8
17	4 13 15.38	7.358	21 37 14.0	20.06	0 31.8
18	4 16 12.05	7.364	21 45 9.3	19.55	0 30.8
19	4 19 8.86	7.369	21 52 52.5	19.05	0 29.8
20	4 22 5.79	7.374	22 0 23.5	18.54	0 28.8
21	4 25 2.83	+7.379	+22 7 42.3	+18.03	0 27.8
22	4 27 59.99	7.384	22 14 48.8	17.52	0 26.8
23	4 30 57.26	7.388	22 21 42.9	17.00	0 25.8
24	4 33 54.62	7.392	22 28 24.7	16.48	0 24.8
25	4 36 52.08	7.396	22 34 54.1	15.96	0 23.8
26	4 39 49.64	+7.400	+22 41 11.0	+15.44	0 22.8
27	4 42 47.27	7.403	22 47 15.4	14.92	0 21.8
28	4 45 44.98	7.406	22 53 7.3	14.40	0 20.8
29	4 48 42.75	7.408	22 58 46.6	13.88	0 19.8
30	4 51 40.57	7.410	23 4 13.2	13.35	0 18.8
31	4 54 38.43	+7.412	+23 9 27.3	+12.82	0 17.9
32	4 57 36.33	+7.413	+23 14 28.7	+12.29	0 16.9

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.
Semidiameter . .	2″.0	2″.0	2″.0	2″.0	2″.0	2″.0	2″.0
Hor. Parallax . .	3.6	3.6	3.5	3.5	3.5	3.5	3.5

JUNE.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	4 57 36.33	+7.413	+23 14 28.7	+12.29	0 16.9
2	5 0 34.26	7.415	23 19 17.4	11.76	0 15.9
3	5 3 32.20	7.416	23 23 53.4	11.23	0 14.9
4	5 6 30.16	7.416	23 28 16.7	10.70	0 13.9
5	5 9 28.11	7.415	23 32 27.2	10.17	0 13.0
6	5 12 26.04	+7.414	+23 36 25.0	+ 9.64	0 12.0
7	5 15 23.96	7.413	23 40 10.0	9.10	0 11.1
8	5 18 21.86	7.412	23 43 42.2	8.57	0 10.1
9	5 21 19.71	7.410	23 47 1.6	8.04	0 9.2
10	5 24 17.52	7.408	23 50 8.3	7.51	0 8.2
11	5 27 15.29	+7.406	+23 53 2.2	+ 6.98	0 7.3
12	5 30 13.00	7.403	23 55 43.3	6.45	0 6.3
13	5 33 10.65	7.400	23 58 11.7	5.92	0 5.3
14	5 36 8.22	7.397	24 0 27.4	5.39	0 4.3
15	5 39 5.72	7.394	24 2 30.3	4.86	0 3.3
16	5 42 3.13	+7.390	+24 4 20.5	+ 4.33	0 2.3
17	5 45 0.45	7.386	24 5 58.1	3.80	0 1.3
18	5 47 57.68	7.382	24 7 23.0	3.27	0 0.3 23 59.3
19	5 50 54.80	7.378	24 8 35.3	2.74	23 58.3
20	5 53 51.80	7.373	24 9 34.9	2.22	23 57.3
21	5 56 48.68	+7.368	+24 10 21.9	+ 1.70	23 56.3
22	5 59 45.43	7.362	24 10 56.4	1.18	23 55.3
23	6 2 42.04	7.356	24 11 18.4	0.66	23 54.3
24	6 5 38.50	7.350	24 11 27.9	+ 0.14	23 53.3
25	6 8 34.80	7.343	24 11 25.0	− 0.38	23 52.3
26	6 11 30.94	+7.336	+24 11 9.6	− 0.90	23 51.3
27	6 14 26.90	7.328	24 10 41.9	1.42	23 50.3
28	6 17 22.67	7.320	24 10 1.8	1.94	23 49.3
29	6 20 18.24	7.311	24 9 9.4	2.45	23 48.3
30	6 23 13.60	7.302	24 8 4.8	2.96	23 47.3
31	6 26 8.74	+7.293	+24 6 47.9	− 3.46	23 46.3
32	6 29 3.65	+7.283	+24 5 19.0	− 3.96	23 45.2

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.
Semidiameter . .	2″.0	2″.0	2″.0	2″.0	2″.0	2″.0
Hor. Parallax . .	3.4	3.4	3.4	3.4	3.4	3.4

NOTE.—The sign + indicates north declinations: the sign — indicates south declinations.

GREENWICH MEAN TIME.

JULY.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	6 26 8.74	+7.293	+24 6 47.9	− 3.46	23 46.3
2	6 29 3.65	7.283	24 5 19.0	3.96	23 45.2
3	6 31 58.33	7.273	24 3 37.9	4.46	23 44.2
4	6 34 52.76	7.263	24 1 44.8	4.96	23 43.1
5	6 37 46.94	7.252	23 59 39.8	5.46	23 42.1
6	6 40 40.85	+7.241	+23 57 22.8	− 5.95	23 41.1
7	6 43 34.50	7.230	23 54 54.0	6.44	23 40.0
8	6 46 27.88	7.219	23 52 13.4	6.93	23 39.0
9	6 49 20.98	7.207	23 49 21.1	7.42	23 37.9
10	6 52 13.79	7.195	23 46 17.2	7.90	23 36.9
11	6 55 6.31	+7.183	+23 43 1.7	− 8.38	23 35.8
12	6 57 58.53	7.170	23 39 34.7	8.86	23 34.7
13	7 0 50.45	7.157	23 35 56.3	9.34	23 33.6
14	7 3 42.06	7.144	23 32 6.6	9.81	23 32.5
15	7 6 33.37	7.131	23 28 5.5	10.28	23 31.4
16	7 9 24.37	+7.118	+23 23 53.3	−10.74	23 30.3
17	7 12 15.05	7.105	23 19 30.0	11.20	23 29.2
18	7 15 5.40	7.091	23 14 55.7	11.66	23 28.1
19	7 17 55.43	7.077	23 10 10.4	12.11	23 27.0
20	7 20 45.12	7.063	23 5 14.3	12.56	23 25.9
21	7 23 34.47	+7.049	+23 0 7.4	−13.01	23 24.8
22	7 26 23.48	7.035	22 54 49.8	13.45	23 23.6
23	7 29 12.14	7.020	22 49 21.6	13.89	23 22.5
24	7 32 0.44	7.005	22 43 42.9	14.33	23 21.3
25	7 34 48.39	6.990	22 37 53.8	14.76	23 20.2
26	7 37 35.97	+6.975	+22 31 54.3	−15.19	23 19.0
27	7 40 23.18	6.959	22 25 44.7	15.61	23 17.9
28	7 43 10.01	6.943	22 19 24.9	16.03	23 16.7
29	7 45 56.46	6.927	22 12 55.1	16.45	23 15.5
30	7 48 42.52	6.911	22 6 15.3	16.86	23 14.3
31	7 51 28.18	+6.894	+21 59 25.7	−17.27	23 13.1
32	7 54 13.45	+6.878	+21 52 26.4	−17.67	23 11.9

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.
Semidiameter . .	2″.0	2″.0	2″.0	2″.0	2″.0	2″.0
Hor. Parallax . .	3.4	3.4	3.4	3.4	3.4	3.4

AUGUST.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	7 54 13.45	+6.878	+21 52 26.4	−17.67	23 11.9
2	7 56 58.32	6.861	21 45 17.4	18.07	23 10.7
3	7 59 42.79	6.844	21 37 59.0	18.47	23 9.5
4	8 2 26.85	6.827	21 30 31.1	18.86	23 8.3
5	8 5 10.51	6.810	21 22 53.9	19.24	23 7.1
6	8 7 53.75	+6.793	+21 15 7.5	−19.62	23 5.9
7	8 10 36.58	6.776	21 7 11.9	20.00	23 4.7
8	8 13 19.00	6.759	20 59 7.4	20.37	23 3.4
9	8 16 1.02	6.742	20 50 54.0	20.74	23 2.1
10	8 18 42.62	6.725	20 42 31.7	21.11	23 0.9
11	8 21 23.82	+6.708	+20 34 0.8	−21.47	22 59.6
12	8 24 4.61	6.691	20 25 21.3	21.83	22 58.4
13	8 26 44.99	6.674	20 16 33.3	22.18	22 57.1
14	8 29 24.97	6.657	20 7 36.9	22.52	22 55.8
15	8 32 4.54	6.640	19 58 32.1	22.86	22 54.5
16	8 34 43.71	+6.624	+19 49 19.2	−23.20	22 53.2
17	8 37 22.47	6.607	19 39 58.3	23.54	22 51.9
18	8 40 0.82	6.590	19 30 29.3	23.67	22 50.6
19	8 42 38.77	6.573	19 20 52.5	24.20	22 49.3
20	8 45 16.32	6.556	19 11 7.9	24.52	22 48.0
21	8 47 53.46	+6.539	+19 1 15.7	−24.83	22 46.7
22	8 50 30.19	6.522	18 51 16.0	25.14	22 45.4
23	8 53 6.51	6.505	18 41 8.8	25.45	22 44.0
24	8 55 42.44	6.488	18 30 54.3	25.75	22 42.6
25	8 58 17.95	6.471	18 20 32.6	26.05	22 41.3
26	9 0 53.05	+6.454	+18 10 3.9	−26.35	22 39.9
27	9 3 27.74	6.437	17 59 28.2	26.64	22 38.6
28	9 6 2.02	6.420	17 48 45.6	26.92	22 37.2
29	9 8 35.90	6.403	17 37 56.2	27.20	22 35.8
30	9 11 9.37	6.386	17 27 0.2	27.47	22 34.4
31	9 13 42.44	+6.369	+17 15 57.7	−27.73	22 33.0
32	9 16 15.10	+6.352	+17 4 48.9	−27.99	22 31.6

Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
Semidiameter . .	2″.0	2″.0	2″.0	2″.0	2″.0	2″.0
Hor. Parallax . .	3.4	3.4	3.4	3.5	3.5	3.5

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign − indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

SEPTEMBER.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	9 16 15.10	+6.352	+17 4 48.9	−27.99	22 31.6
2	9 18 47.36	6.335	16 53 33.7	28.25	22 30.2
3	9 21 19.20	6.318	16 42 12.4	28.51	22 28.8
4	9 23 50.66	6.302	16 30 45.0	28.76	22 27.4
5	9 26 21.72	6.286	16 19 11.6	29.01	22 25.9
6	9 28 52.39	+6.270	+16 7 32.3	−29.25	22 24.5
7	9 31 22.69	6.254	15 55 47.3	29.49	22 23.0
8	9 33 52.60	6.239	15 43 56.7	29.72	22 21.5
9	9 36 22.13	6.223	15 32 0.5	29.95	22 20.1
10	9 38 51.29	6.207	15 19 58.8	30.18	22 18.6
11	9 41 20.09	+6.192	+15 7 51.8	−30.40	22 17.2
12	9 43 48.52	6.177	14 55 39.6	30.62	22 15.7
13	9 46 16.60	6.162	14 43 22.2	30.83	22 14.3
14	9 48 44.32	6.148	14 30 59.7	31.04	22 12.8
15	9 51 11.69	6.133	14 18 32.3	31.24	22 11.3
16	9 53 38.72	+6.119	+14 6 0.1	−31.44	22 9.8
17	9 56 5.40	6.105	13 53 23.1	31.64	22 8.3
18	9 58 31.75	6.090	13 40 41.5	31.83	22 6.8
19	10 0 57.75	6.076	13 27 55.4	32.01	22 5.3
20	10 3 23.42	6.062	13 15 4.8	32.19	22 3.8
21	10 5 48.75	+6.048	+13 2 10.0	−32.37	22 2.3
22	10 8 13.75	6.034	12 49 10.9	32.54	22 0.7
23	10 10 38.42	6.021	12 36 7.8	32.71	21 59.2
24	10 13 2.77	6.007	12 23 0.8	32.87	21 57.7
25	10 15 26.79	5.994	12 9 49.8	33.03	21 56.1
26	10 17 50.49	+5.981	+11 56 35.2	−33.19	21 54.6
27	10 20 13.87	5.967	11 43 16.9	33.34	21 53.0
28	10 22 36.93	5.954	11 29 55.0	33.48	21 51.5
29	10 24 59.68	5.941	11 16 29.8	33.62	21 49.9
30	10 27 22.12	5.928	11 3 1.2	33.76	21 48.3
31	10 29 44.25	+5.916	+10 49 29.5	−33.89	21 46.7
32	10 32 6.08	+5.904	+10 35 54.6	−34.02	21 45.1

Day of the Month.	3d.	8th.	13th.	18th.	23d.	28th.
	″	″	″	″	″	″
Semidiameter . .	2.0	2.0	2.0	2.0	2.1	2.1
Hor. Parallax . .	3.5	3.5	3.6	3.6	3.7	3.7

OCTOBER.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	10 29 44.25	+5.916	+10 49 29.5	−33.89	21 46.7
2	10 32 6.08	5.904	10 35 54.6	34.02	21 45.1
3	10 34 27.62	5.892	10 22 16.8	34.14	21 43.5
4	10 36 48.87	5.880	10 8 36.0	34.26	21 41.9
5	10 39 9.84	5.868	9 54 52.4	34.37	21 40.3
6	10 41 30.52	+5.856	+ 9 41 6.1	−34.48	21 38.7
7	10 43 50.93	5.845	9 27 17.2	34.59	21 37.1
8	10 46 11.08	5.834	9 13 25.8	34.70	21 35.5
9	10 48 30.96	5.823	8 59 31.8	34.80	21 33.9
10	10 50 50.59	5.813	8 45 35.6	34.89	21 32.3
11	10 53 9.98	+5.803	+ 8 31 37.0	−34.98	21 30.7
12	10 55 29.12	5.793	8 17 36.3	35.07	21 29.0
13	10 57 48.02	5.783	8 3 33.5	35.15	21 27.4
14	11 0 6.68	5.773	7 49 28.8	35.23	21 25.8
15	11 2 25.11	5.763	7 35 22.1	35.31	21 24.1
16	11 4 43.32	+5.754	+ 7 21 13.6	−35.38	21 22.5
17	11 7 1.31	5.745	7 7 3.5	35.45	21 20.8
18	11 9 19.07	5.736	6 52 51.7	35.52	21 19.2
19	11 11 36.62	5.727	6 38 38.5	35.58	21 17.6
20	11 13 53.95	5.718	6 24 23.8	35.64	21 15.9
21	11 16 11.08	+5.709	+ 6 10 7.9	−35.69	21 14.3
22	11 18 27.99	5.700	5 55 50.8	35.74	21 12.6
23	11 20 44.70	5.691	5 41 32.6	35.78	21 11.0
24	11 23 1.20	5.683	5 27 13.5	35.82	21 9.3
25	11 25 17.50	5.675	5 12 53.4	35.85	21 7.6
26	11 27 33.59	+5.666	+ 4 58 32.6	−35.88	21 5.9
27	11 29 49.49	5.658	4 44 11.2	35.90	21 4.2
28	11 32 5.20	5.650	4 29 49.2	35.92	21 2.6
29	11 34 20.72	5.642	4 15 26.8	35.94	21 0.9
30	11 36 36.05	5.635	4 1 4.1	35.95	20 59.2
31	11 38 51.20	+5.628	+ 3 46 41.0	−35.96	20 57.5
32	11 41 6.18	+5.621	+ 3 32 17.8	−35.97	20 55.8

Day of the Month.	3d.	8th.	13th.	18th.	23d.	28th.
	″	″	″	″	″	″
Semidiameter . .	2.1	2.1	2.2	2.2	2.2	2.3
Hor. Parallax . .	3.7	3.8	3.8	3.8	3.9	3.9

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	11 41 6.18	+5.621	+3 32 17.8	−35.97	20 55.8
2	11 43 20.98	5.614	3 17 54.5	35.97	20 54.1
3	11 45 35.62	5.607	3 3 31.1	35.97	20 52.4
4	11 47 50.10	5.600	2 49 7.9	35.97	20 50.7
5	11 50 4.42	5.593	2 34 44.8	35.96	20 49.0
6	11 52 18.59	+5.587	+2 20 21.9	−35.95	20 47.3
7	11 54 32.62	5.581	2 5 59.4	35.93	20 45.6
8	11 56 46.51	5.575	1 51 37.3	35.91	20 43.9
9	11 59 0.27	5.570	1 37 15.6	35.89	20 42.2
10	12 1 13.89	5.565	1 22 54.5	35.87	20 40.5
11	12 3 27.39	+5.560	+1 8 34.0	−35.84	20 38.7
12	12 5 40.77	5.555	0 54 14.2	35.81	20 37.0
13	12 7 54.02	5.550	0 39 55.3	35.77	20 35.3
14	12 10 7.16	5.545	0 25 37.3	35.73	20 33.6
15	12 12 20.18	5.540	+0 11 20.3	35.69	20 31.9
16	12 14 33.08	+5.535	−0 2 55.6	−35.64	20 30.1
17	12 16 45.87	5.530	0 17 10.3	35.59	20 28.4
18	12 18 58.55	5.526	0 31 23.7	35.53	20 26.6
19	12 21 11.12	5.521	0 45 35.7	35.47	20 24.9
20	12 23 23.58	5.516	0 59 46.2	35.40	20 23.1
21	12 25 35.93	+5.512	−1 13 55.1	−35.33	20 21.4
22	12 27 48.16	5.507	1 28 2.3	35.26	20 19.7
23	12 30 0.29	5.502	1 42 7.7	35.19	20 17.9
24	12 32 12.31	5.498	1 56 11.2	35.11	20 16.2
25	12 34 24.22	5.493	2 10 12.6	35.02	20 14.4
26	12 36 36.02	+5.489	−2 24 12.0	−34.93	20 12.7
27	12 38 47.72	5.485	2 38 9.2	34.84	20 11.0
28	12 40 59.32	5.481	2 52 4.2	34.74	20 9.2
29	12 43 10.82	5.477	3 5 56.8	34.64	20 7.5
30	12 45 22.22	5.473	3 19 47.0	34.54	20 5.7
31	12 47 33.53	+5.469	−3 33 34.7	−34.43	20 4.0
32	12 49 44.75	+5.465	−3 47 19.8	−34.32	20 2.2

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.
	″	″	″	″	″	″
Semidiameter . . .	2.3	2.3	2.4	2.4	2.5	2.5
Hor. Parallax . . .	4.0	4.1	4.2	4.2	4.3	4.4

DECEMBER.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	12 47 33.53	+5.469	− 3 33 34.7	−34.43	20 4.0
2	12 49 44.75	5.465	3 47 19.8	34.32	20 2.2
3	12 51 55.88	5.462	4 1 2.3	34.21	20 0.5
4	12 54 6.92	5.458	4 14 42.0	34.10	19 58.7
5	12 56 17.89	5.455	4 28 19.0	33.98	19 57.0
6	12 58 28.78	+5.452	− 4 41 53.1	−33.86	19 55.2
7	13 0 39.59	5.449	4 55 24.2	33.74	19 53.4
8	13 2 50.32	5.446	5 8 52.4	33.61	19 51.7
9	13 5 0.98	5.443	5 22 17.5	33.48	19 49.9
10	13 7 11.57	5.440	5 35 39.4	33.35	19 48.2
11	13 9 22.09	+5.437	− 5 48 58.2	−33.21	19 46.4
12	13 11 32.54	5.434	6 2 13.6	33.07	19 44.7
13	13 13 42.91	5.431	6 15 25.6	32.93	19 42.9
14	13 15 53.21	5.428	6 28 34.2	32.78	19 41.1
15	13 18 3.43	5.424	6 41 39.2	32.63	19 39.3
16	13 20 13.57	+5.421	− 6 54 40.5	−32.48	19 37.5
17	13 22 23.63	5.418	7 7 38.2	32.32	19 35.8
18	13 24 33.60	5.414	7 20 31.9	32.16	19 34.0
19	13 26 43.49	5.410	7 33 21.7	31.99	19 32.2
20	13 28 53.28	5.406	7 46 7.5	31.82	19 30.4
21	13 31 2.98	+5.402	− 7 58 49.2	−31.65	19 28.6
22	13 33 12.57	5.398	8 11 26.7	31.47	19 26.9
23	13 35 22.06	5.394	8 23 59.9	31.29	19 25.1
24	13 37 31.45	5.389	8 36 28.7	31.11	19 23.3
25	13 39 40.73	5.385	8 48 53.1	30.92	19 21.5
26	13 41 49.90	+5.380	− 9 1 13.0	−30.73	19 19.7
27	13 43 58.96	5.375	9 13 28.3	30.54	19 17.9
28	13 46 7.90	5.371	9 25 39.0	30.35	19 16.1
29	13 48 16.73	5.366	9 37 44.9	30.15	19 14.3
30	13 50 25.44	5.361	9 49 46.1	29.95	19 12.5
31	13 52 34.04	+5.356	−10 1 42.4	−29.75	19 10.7
32	13 54 42.52	+5.351	−10 13 33.9	−29.54	19 8.9

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	32d.
	″	″	″	″	″	″	″
Semidiameter . .	2.6	2.6	2.7	2.8	2.8	2.9	3.0
Hor. Parallax . .	4.5	4.6	4.7	4.8	5.0	5.1	5.2

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

JANUARY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	17 28 4.00	+2.397	−22 52 2.2	−2.01	22 40.0
2	17 29 1.47	2.392	22 52 49.7	1.95	22 37.0
3	17 29 58.81	2.386	22 53 35.7	1.89	22 34.0
4	17 30 56.02	2.380	22 54 20.3	1.83	22 31.0
5	17 31 53.08	2.374	22 55 3.4	1.77	22 28.0
6	17 32 49.99	+2.368	−22 55 45.2	−1.71	22 25.0
7	17 33 46.74	2.361	22 56 25.4	1.65	22 22.0
8	17 34 43.33	2.354	22 57 4.3	1.59	22 19.0
9	17 35 39.75	2.347	22 57 41.8	1.53	22 16.0
10	17 36 36.00	2.340	22 58 17.8	1.47	22 13.0
11	17 37 32.06	+2.332	−22 58 52.5	−1.41	22 10.0
12	17 38 27.93	2.324	22 59 25.8	1.36	22 7.0
13	17 39 23.61	2.316	22 59 57.7	1.30	22 4.0
14	17 40 19.09	2.308	23 0 28.2	1.24	22 1.0
15	17 41 14.37	2.299	23 0 57.4	1.19	21 58.0
16	17 42 9.43	+2.290	−23 1 25.2	−1.13	21 55.0
17	17 43 4.27	2.281	23 1 51.7	1.07	21 51.9
18	17 43 58.88	2.271	23 2 16.9	1.02	21 48.9
19	17 44 53.27	2.261	23 2 40.8	0.96	21 45.9
20	17 45 47.42	2.251	23 3 3.4	0.91	21 42.8
21	17 46 41.32	+2.241	−23 3 24.8	−0.86	21 39.8
22	17 47 34.97	2.230	23 3 44.9	0.81	21 36.7
23	17 48 28.37	2.219	23 4 3.7	0.76	21 33.7
24	17 49 21.51	2.208	23 4 21.3	0.71	21 30.6
25	17 50 14.37	2.197	23 4 37.7	0.66	21 27.6
26	17 51 6.95	+2.185	−23 4 52.9	−0.61	21 24.5
27	17 51 59.24	2.173	23 5 7.0	0.56	21 21.5
28	17 52 51.24	2.160	23 5 19.8	0.51	21 18.4
29	17 53 42.93	2.147	23 5 31.6	0.46	21 15.3
30	17 54 34.32	2.134	23 5 42.2	0.42	21 12.2
31	17 55 25.39	+2.121	−23 5 51.7	−0.37	21 9.1
32	17 56 16.12	+2.107	−23 6 0.0	−0.32	21 6.0

Day of the Month.	3d.	11th.	19th.	27th.
Polar Semidiameter . .	15″.2	15″.3	15″.5	15″.7
Horizontal Parallax . .	1.4	1.4	1.5	1.5

FEBRUARY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	17 56 16.12	+2.107	−23 6 0.0	−0.32	21 6.0
2	17 57 6.53	2.093	23 6 7.4	0.28	21 2.9
3	17 57 56.59	2.079	23 6 13.6	0.23	20 59.8
4	17 58 46.30	2.064	23 6 18.9	0.19	20 56.7
5	17 59 35.66	2.049	23 6 23.1	0.15	20 53.6
6	18 0 24.65	+2.034	−23 6 26.3	−0.11	20 50.5
7	18 1 13.28	2.018	23 6 28.6	0.07	20 47.3
8	18 2 1.52	2.002	23 6 29.9	−0.04	20 44.2
9	18 2 49.38	1.986	23 6 30.3	0.00	20 41.1
10	18 3 36.85	1.970	23 6 29.9	+0.04	20 37.9
11	18 4 23.93	+1.953	−23 6 28 5	+0.07	20 34.7
12	18 5 10.60	1.936	23 6 26.2	0.11	20 31.6
13	18 5 56.87	1.919	23 6 23.1	0.15	20 28.4
14	18 6 42.71	1.902	23 6 19.3	0.18	20 25.2
15	18 7 28.14	1.884	23 6 14.7	0.21	20 22.0
16	18 8 13.14	+1.866	−23 6 9.3	+0.24	20 18.8
17	18 8 57.70	1.847	23 6 3.2	0.27	20 15.6
18	18 9 41.81	1.829	23 5 56.4	0.30	20 12.4
19	18 10 25.48	1.810	23 5 48.9	0.33	20 9.2
20	18 11 8.69	1.791	23 5 40.8	0.35	20 6.0
21	18 11 51.44	+1.771	−23 5 32.1	+0.38	20 2.8
22	18 12 33.72	1.751	23 5 22.8	0.40	19 59.6
23	18 13 15.51	1.731	23 5 13.0	0.42	19 56.3
24	18 13 56.81	1.710	23 5 2.5	0.44	19 53.1
25	18 14 37.62	1.689	23 4 51.6	0.46	19 49.8
26	18 15 17.92	+1.668	−23 4 40.2	+0.48	19 46.5
27	18 15 57.71	1.647	23 4 28.4	0.50	19 43.2
28	18 16 36.98	1.625	23 4 16.1	0.52	19 39.9
29	18 17 15.72	1.603	23 4 3.4	0.54	19 36.6
30	18 17 53.92	1.580	23 3 50.4	0.56	19 33.3
31	18 18 31.57	+1.557	−23 3 37.0	+0.57	19 30.0
32	18 19 8.67	+1.534	−23 3 23.2	+0.58	19 26.7

Day of the Month.	4th.	12th.	20th.	28th.
Polar Semidiameter . .	15″.9	16″.2	16″.5	16″.8
Horizontal Parallax . .	1.5	1.5	1.6	1.6

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

MARCH.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	18 17 15.72	+1.603	−23 4 3.4	+0.54	19 36.6
2	18 17 53.92	1.580	23 3 50.4	0.56	19 33.3
3	18 18 31.57	1.557	23 3 37.0	0.57	19 30.0
4	18 19 8.67	1.534	23 3 23.2	0.58	19 26.7
5	18 19 45.21	1.511	23 3 9.2	0.59	19 23.4
6	18 20 21.18	+1.487	−23 2 55.0	+0.60	19 20.0
7	18 20 56.58	1.463	23 2 40.5	0.61	19 16.7
8	18 21 31.40	1.439	23 2 25.8	0.62	19 13.3
9	18 22 5.63	1.414	23 2 10.9	0.63	19 9.9
10	18 22 39.27	1.389	23 1 55.9	0.64	19 6.6
11	18 23 12.30	+1.364	−23 1 40.8	+0.65	19 3.2
12	18 23 44.73	1.339	23 1 25.6	0.65	18 59.8
13	18 24 16.55	1.313	23 1 10.3	0.66	18 56.4
14	18 24 47.75	1.287	23 0 55.0	0.66	18 53.0
15	18 25 18.33	1.261	23 0 39.7	0.65	18 49.5
16	18 25 48.28	+1.235	−23 0 24.5	+0.64	18 46.1
17	18 26 17.59	1.208	23 0 9.3	0.64	18 42.6
18	18 26 46.26	1.181	22 59 54.2	0.63	18 39.1
19	18 27 14.28	1.154	22 59 39.2	0.62	18 35.6
20	18 27 41.63	1.126	22 59 24.3	0.62	18 32.1
21	18 28 8.32	+1.098	−22 59 9.7	+0.61	18 28.6
22	18 28 34.34	1.070	22 58 55.2	0.60	18 25.1
23	18 28 59.68	1.042	22 58 41.0	0.59	18 21.6
24	18 29 24.34	1.013	22 58 27.0	0.58	18 18.1
25	18 29 48.30	0.984	22 58 13.2	0.57	18 14.5
26	18 30 11.55	+0.955	−22 57 59.8	+0.56	18 11.0
27	18 30 34.10	0.925	22 57 46.7	0.55	18 7.4
28	18 30 55.94	0.895	22 57 33.9	0.53	18 3.9
29	18 31 17.05	0.865	22 57 21.5	0.51	18 0.3
30	18 31 37.43	0.834	22 57 9.5	0.49	17 56.7
31	18 31 57.08	+0.803	−22 56 57.9	+0.47	17 53.1
32	18 32 15.98	+0.772	−22 56 46.7	+0.45	17 49.4

Day of the Month.	8th.	16th.	24th.
	″	″	″
Polar Semidiameter	17.2	17.6	18.0
Horizontal Parallax	1.6	1.7	1.7

APRIL.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	18 32 15.98	+0.772	−22 56 46.7	+0.45	17 49.4
2	18 32 34.14	0.741	22 56 36.1	0.43	17 45.8
3	18 32 51.55	0.710	22 56 25.9	0.41	17 42.1
4	18 33 8.20	0.679	22 56 16.2	0.39	17 38.5
5	18 33 24.09	0.647	22 56 7.0	0.37	17 34.8
6	18 33 39.21	+0.615	−22 55 58.4	+0.35	17 31.1
7	18 33 53.56	0.583	22 55 50.3	0.33	17 27.4
8	18 34 7.14	0.550	22 55 42.9	0.30	17 23.7
9	18 34 19.95	0.517	22 55 36.0	0.27	17 20.0
10	18 34 31.98	0.485	22 55 29.7	0.25	17 16.2
11	18 34 43.22	+0.452	−22 55 24.1	+0.22	17 12.5
12	18 34 53.68	0.419	22 55 19.1	0.19	17 8.7
13	18 35 3.35	0.386	22 55 14.8	0.17	17 4.9
14	18 35 12.23	0.353	22 55 11.2	0.14	17 1.1
15	18 35 20.31	0.320	22 55 8.3	0.11	16 57.3
16	18 35 27.60	+0.287	−22 55 6.1	+0.08	16 53.5
17	18 35 34.09	0.254	22 55 4.5	0.05	16 49.6
18	18 35 39.77	0.220	22 55 3.7	+0.02	16 45.8
19	18 35 44.64	0.186	22 55 3.6	−0.01	16 41.9
20	18 35 48.70	0.152	22 55 4.2	0.04	16 38.1
21	18 35 51.95	+0.118	−22 55 5.6	−0.07	16 34.2
22	18 35 54.38	0.084	22 55 7.7	0.10	16 30.3
23	18 35 56.00	0.050	22 55 10.6	0.13	16 26.4
24	18 35 56.80	+0.016	22 55 14.3	0.17	16 22.4
25	18 35 56.78	−0.018	22 55 18.7	0.20	16 18.5
26	18 35 55.93	−0.053	−22 55 23.9	−0.23	16 14.5
27	18 35 54.26	0.087	22 55 29.8	0.26	16 10.6
28	18 35 51.77	0.121	22 55 36.4	0.30	16 6.6
29	18 35 48.46	0.155	22 55 43.9	0.33	16 2.6
30	18 35 44.32	0.189	22 55 52.0	0.36	15 58.6
31	18 35 39.37	−0.223	−22 56 1.0	−0.39	15 54.5
32	18 35 33.61	−0.257	−22 56 10.6	−0.42	15 50.5

Day of the Month.	1st.	9th.	17th.	25th.
	″	″	″	″
Polar Semidiameter . .	18.5	19.0	19.5	20.0
Horizontal Parallax . .	1.7	1.8	1.8	1.9

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	18 35 39.37	−0.223	−22 56 1.0	−0.39	15 54.5	1	18 26 52.98	−1.129	−23 5 34.3	−1.01	13 43.7
2	18 35 33.61	0.257	22 56 10.6	0.42	15 50.5	2	18 26 25.63	1.150	23 5 58.6	1.02	13 39.3
3	18 35 27.04	0.291	22 56 21.0	0.45	15 46.5	3	18 25 57.79	1.170	23 6 23.0	1.02	13 35.0
4	18 35 19.65	0.325	22 56 32.1	0.48	15 42.4	4	18 25 29.48	1.189	23 6 47.5	1.02	13 30.6
5	18 35 11.47	0.358	22 56 43.9	0.51	15 38.3	5	18 25 0.71	1.208	23 7 12.1	1.02	13 26.1
6	18 35 2.48	−0.391	−22 56 56.4	−0.54	15 34.2	6	18 24 31.51	−1.225	−23 7 36.6	−1.02	13 21.7
7	18 34 52.71	0.424	22 57 9.7	0.57	15 30.1	7	18 24 1.90	1.242	23 8 1.1	1.02	13 17.3
8	18 34 42.15	0.457	22 57 23.6	0.60	15 26.0	8	18 23 31.90	1.258	23 8 25.5	1.02	13 12.9
9	18 34 30.81	0.489	22 57 38.2	0.62	15 21.9	9	18 23 1.52	1.273	23 8 49.9	1.01	13 8.4
10	18 34 18.69	0.521	22 57 53.4	0.65	15 17.8	10	18 22 30.79	1.287	23 9 14.1	1.01	13 4.0
11	18 34 5.81	−0.553	−22 58 9.4	−0.68	15 13.6	11	18 21 59.73	−1.301	−23 9 38.2	−1.00	12 59.5
12	18 33 52.17	0.585	22 58 25.9	0.70	15 9.4	12	18 21 28.36	1.313	23 10 2.2	0.99	12 55.1
13	18 33 37.77	0.616	22 58 43.0	0.73	15 5.2	13	18 20 56.69	1.325	23 10 26 0	0.99	12 50.6
14	18 33 22.63	0.647	22 59 0.7	0.75	15 1.1	14	18 20 24.76	1.336	23 10 49.6	0.98	12 46.2
15	18 33 6.75	0.677	22 59 19.0	0.77	14 56.9	15	18 19 52.57	1.346	23 11 12.9	0.97	12 41.7
16	18 32 50.13	−0.707	−22 59 37.9	−0.80	14 52.6	16	18 19 20.16	−1.355	−23 11 36.1	−0.96	12 37.2
17	18 32 32.79	0.737	22 59 57.2	0.82	14 48 4	17	18 18 47.54	1.363	23 11 58.9	0.95	12 32.7
18	18 32 14.74	0.767	23 0 17.1	0.84	14 44.2	18	18 18 14.74	1.370	23 12 21.4	0.94	12 28.3
19	18 31 55.98	0.796	23 0 37.5	0.86	14 39.9	19	18 17 41.77	1.376	23 12 43.7	0.93	12 23.8
20	18 31 36.52	0.825	23 0 58.3	0.88	14 35.7	20	18 17 8.66	1.382	23 13 5.6	0.91	12 19.3
21	18 31 16.38	−0.853	−23 1 19.5	−0.89	14 31.4	21	18 16 35.44	−1.386	−23 13 27.2	−0.90	12 14.8
22	18 30 55.56	0.881	23 1 41.1	0.90	14 27.1	22	18 16 2.12	1.389	23 13 48.4	0.88	12 10.3
23	18 30 34.08	0.909	23 2 3.2	0.91	14 22.8	23	18 15 28.73	1.392	23 14 9.2	0.86	12 5.9
24	18 30 11.93	0.937	23 2 25.6	0 92	14 18.5	24	18 14 55.30	1.393	23 14 29.7	0.85	12 1.4
25	18 29 49.15	0.963	23 2 48.3	0.94	14 14.2	25	18 14 21.84	1.394	23 14 49.8	0.83	11 56.9
26	18 29 25.74	−0.988	−23 3 11.4	−0.95	14 9.9	26	18 13 48.39	−1.393	−23 15 9.4	−0.81	11 52.4
27	18 29 1.72	1.013	23 3 34.7	0.96	14 5.5	27	18 13 14.97	1.391	23 15 28.6	0.80	11 47.9
28	18 28 37.10	1.037	23 3 58.2	0.98	14 1.2	28	18 12 41.60	1.388	23 15 47.4	0.78	11 43.4
29	18 28 11.90	1.061	23 4 22.0	0.99	13 56.8	29	18 12 8.31	1.385	23 16 5.7	0.76	11 38.9
30	18 27 46.14	1.085	23 4 45.9	1.00	13 52.5	30	18 11 35.12	1.380	23 16 23.7	0.74	11 34.4
31	18 27 19.83	−1.107	−23 5 10.0	−1.01	13 48.1	31	18 11 2.06	−1.374	−23 16 41.2	−0.72	11 30.0
32	18 26 52.98	−1.129	−23 5 34.3	−1.01	13 43.7	32	18 10 29.16	−1.367	−23 16 58.2	−0.70	11 25.5

Day of the Month.	3d.	11th.	19th.	27th.	Day of the Month.	4th.	12th.	20th.	28th.
Polar Semidiameter . .	20.″4	20.″9	21.″3	21.″7	Polar Semidiameter . .	22.″0	22.″2	22.″3	22.″3
Horizontal Parallax . .	1.9	2.0	2.0	2.0	Horizontal Parallax . .	2.1	2.1	2.1	2.1

NOTE.—The sign + indicates north declinations: the sign — indicates south declinations.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	18 11 2.06	−1.374	−23 16 41.2	−0.72	11 30.0	1	17 56 56.70	−0.777	−23 22 34.4	−0.30	9 14.2
2	18 10 29.16	1.367	23 16 58.2	0.70	11 25.5	2	17 56 38.40	0.747	23 22 41.6	0.30	9 10.0
3	18 9 56.44	1.359	23 17 14.8	0.68	11 21.0	3	17 56 20.82	0.717	23 22 48.8	0.30	9 5.7
4	18 9 23.91	1.350	23 17 31.0	0.66	11 16.5	4	17 56 3.98	0.686	23 22 55.9	0.29	9 1.5
5	18 8 51.61	1.341	23 17 46.8	0.65	11 12.1	5	17 55 47.88	0.655	23 23 2.9	0.29	8 57.3
6	18 8 19.55	−1.331	−23 18 2.1	−0.63	11 7.6	6	17 55 32.52	−0.624	−23 23 9.9	−0.29	8 53.1
7	18 7 47.76	1.319	23 18 17.0	0.61	11 3.2	7	17 55 17.92	0.592	23 23 16.9	0.29	8 49.0
8	18 7 16.27	1.306	23 18 31.5	0.59	10 58.7	8	17 55 4.08	0.560	23 23 23.8	0.29	8 44.8
9	18 6 45.08	1.292	23 18 45.6	0.57	10 54.3	9	17 54 51.01	0.528	23 23 30.8	0.29	8 40.7
10	18 6 14.22	1.278	23 18 59.2	0.55	10 49.8	10	17 54 38.72	0.496	23 23 37.7	0.29	8 36.6
11	18 5 43.72	−1.263	−23 19 12.4	−0.54	10 45.4	11	17 54 27.20	−0.463	−23 23 44.6	−0.29	8 32.4
12	18 5 13.59	1.247	23 19 25.2	0.52	10 40.9	12	17 54 16.46	0.430	23 23 51.5	0.29	8 28.3
13	18 4 43.85	1.230	23 19 37.6	0.50	10 36.5	13	17 54 6.52	0.397	23 23 58.5	0.29	8 24.2
14	18 4 14.51	1.213	23 19 49.6	0.49	10 32.1	14	17 53 57.37	0.364	23 24 5.5	0.30	8 20.1
15	18 3 45.61	1.195	23 20 1.3	0.47	10 27.7	15	17 53 49.01	0.331	23 24 12.5	0.30	8 16.1
16	18 3 17.14	−1.176	−23 20 12.6	−0.46	10 23.3	16	17 53 41.46	−0.298	−23 24 19.6	−0.30	8 12.0
17	18 2 49.15	1.157	23 20 23.5	0.45	10 18.9	17	17 53 34.72	0.264	23 24 26.7	0.30	8 8.0
18	18 2 21.63	1.136	23 20 34.1	0.43	10 14.5	18	17 53 28.78	0.230	23 24 33.9	0.30	8 4.0
19	18 1 54.62	1.115	23 20 44.3	0.42	10 10.2	19	17 53 23.66	0.196	23 24 41.2	0.30	8 0.0
20	18 1 28.13	1.093	23 20 54.2	0.41	10 5.8	20	17 53 19.36	0.162	23 24 48.5	0.31	7 56.0
21	18 1 2.17	−1.070	−23 21 3.9	−0.39	10 1.5	21	17 53 15.87	−0.128	−23 24 56.0	−0.31	7 52.0
22	18 0 36.77	1.047	23 21 13.2	0.38	9 57.1	22	17 53 13.21	0.094	23 25 3.5	0.31	7 48.0
23	18 0 11.94	1.023	23 21 22.3	0.37	9 52.8	23	17 53 11.37	0.060	23 25 11.0	0.32	7 44.0
24	17 59 47.69	0.998	23 21 31.1	0.36	9 48.4	24	17 53 10.37	−0.025	23 25 18.7	0.32	7 40.1
25	17 59 24.04	0.972	23 21 39.7	0.35	9 44.1	25	17 53 10.19	+0.010	23 25 26.5	0.33	7 36.2
26	17 59 1.02	−0.946	−23 21 48.0	−0.34	9 39.8	26	17 53 10.84	+0.045	−23 25 34.4	−0.33	7 32.2
27	17 58 38.63	0.919	23 21 56.1	0.33	9 35.5	27	17 53 12.32	0.080	23 25 42.4	0.34	7 28.3
28	17 58 16.89	0.892	23 22 4.1	0.32	9 31.2	28	17 53 14.63	0.114	23 25 50.5	0.34	7 24.5
29	17 57 55.81	0.864	23 22 11.9	0.32	9 26.9	29	17 53 17.77	0.149	23 25 58.6	0.35	7 20.6
30	17 57 35.41	0.835	23 22 19.5	0.31	9 22.7	30	17 53 21.74	0.183	23 26 6.9	0.35	7 16.7
31	17 57 15.70	−0.806	−23 22 27.0	−0.30	9 18.4	31	17 53 26.53	+0.217	−23 26 15.2	−0.35	7 12.9
32	17 56 56.70	−0.777	−23 22 34.4	−0.30	9 14.2	32	17 53 32.15	+0.251	−23 26 23.6	−0.35	7 9.0

Day of the Month.	6th.	14th.	22d.	30th.	Day of the Month.	7th.	15th.	23d.	31st.
	″	″	″	″		″	″	″	″
Polar Semidiameter . .	22.3	22.1	21.8	21.5	Polar Semidiameter . .	21.1	20.7	20.2	19.7
Horizontal Parallax . .	2.1	2.1	2.1	2.0	Horizontal Parallax . .	2.0	1.9	1.9	1.9

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign − indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

SEPTEMBER.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	17 53 32.15	+0.251	−23 26 23.6	−0.35	7 9.0
2	17 53 38.59	0.285	23 26 32.1	0.35	7 5.2
3	17 53 45.84	0.319	23 26 40.6	0.36	7 1.4
4	17 53 53.90	0.353	23 26 49.2	0.36	6 57.6
5	17 54 2.78	0.387	23 26 57.9	0.36	6 53.8
6	17 54 12.46	+0.420	−23 27 6.5	−0.36	6 50.1
7	17 54 22.94	0.453	23 27 15.2	0.36	6 46.3
8	17 54 34.21	0.486	23 27 23.9	0.36	6 42.5
9	17 54 46.28	0.519	23 27 32.6	0.36	6 38.8
10	17 54 59.14	0.552	23 27 41.3	0.36	6 35.1
11	17 55 12.77	+0.584	−23 27 50.0	−0.36	6 31.4
12	17 55 27.19	0.616	23 27 58.6	0.36	6 27.7
13	17 55 42.37	0.648	23 28 7.2	0.35	6 24.1
14	17 55 58.32	0.680	23 28 15.7	0.35	6 20.4
15	17 56 15.04	0.712	23 28 24.1	0.35	6 16.7
16	17 56 32.53	+0.744	−23 28 32.5	−0.34	6 13.1
17	17 56 50.77	0.775	23 28 40.7	0.34	6 9.5
18	17 57 9.78	0.806	23 28 48.8	0.33	6 5.9
19	17 57 29.53	0.838	23 28 56.8	0.33	6 2.3
20	17 57 50.02	0.869	23 29 4.6	0.32	5 58.7
21	17 58 11.26	+0.900	−23 29 12.2	−0.31	5 55.1
22	17 58 33.22	0.931	23 29 19.6	0.31	5 51.5
23	17 58 55.92	0.961	23 29 26.9	0.30	5 48.0
24	17 59 19.33	0.991	23 29 33.9	0.29	5 44.4
25	17 59 43.47	1.021	23 29 40.6	0.28	5 40.9
26	18 0 8.31	+1.050	−23 29 47.1	−0.27	5 37.4
27	18 0 33.86	1.079	23 29 53.3	0.25	5 33.9
28	18 1 0.11	1.108	23 29 59.2	0.24	5 30.4
29	18 1 27.05	1.137	23 30 4.7	0.23	5 26.9
30	18 1 54.67	1.165	23 30 9.9	0.21	5 23.4
31	18 2 22.96	+1.193	−23 30 14.8	−0.20	5 20.0
32	18 2 51.92	+1.221	−23 30 19.2	−0.18	5 16.5

Day of the Month.	8th.	16th.	24th.
Polar Semidiameter	19.″3	18.″8	18.″3
Horizontal Parallax	1.8	1.8	1.7

OCTOBER.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	18 2 22.96	+1.193	−23 30 14.8	−0.20	5 20.0
2	18 2 51.92	1.221	23 30 19.2	0.18	5 16.5
3	18 3 21.54	1.248	23 30 23.2	0.16	5 13.0
4	18 3 51.81	1.275	23 30 26.8	0.14	5 9.6
5	18 4 22.72	1.302	23 30 29.9	0.12	5 6.2
6	18 4 54.28	+1.328	−23 30 32.5	−0.10	5 2.8
7	18 5 26.46	1.354	23 30 34.6	0.08	4 59.4
8	18 5 59.26	1.380	23 30 36.1	0.06	4 56.0
9	18 6 32.67	1.405	23 30 37.1	0.03	4 52.6
10	18 7 6.69	1.430	23 30 37.5	−0.01	4 49.3
11	18 7 41.31	+1.455	−23 30 37.3	+0.02	4 45.9
12	18 8 16.52	1.480	23 30 36.4	0.05	4 42.6
13	18 8 52.33	1.504	23 30 34.9	0.07	4 39.2
14	18 9 28.72	1.528	23 30 32.7	0.10	4 35.9
15	18 10 5.68	1.552	23 30 29.9	0.13	4 32.6
16	18 10 43.20	+1.576	−23 30 26.3	+0.16	4 29.3
17	18 11 21.29	1.599	23 30 22.0	0.19	4 26.0
18	18 11 59.94	1.622	23 30 16.9	0.23	4 22.7
19	18 12 39.13	1.645	23 30 11.1	0.26	4 19.4
20	18 13 18.87	1.667	23 30 4.4	0.29	4 16.2
21	18 13 59.15	+1.689	−23 29 56.9	+0.33	4 12.9
22	18 14 39.95	1.711	23 29 48.6	0.36	4 9.7
23	18 15 21.27	1.733	23 29 39.4	0.40	4 6.4
24	18 16 3.11	1.754	23 29 29.3	0.44	4 3.2
25	18 16 45.45	1.775	23 29 18.3	0.48	3 59.9
26	18 17 28.29	+1.796	−23 29 6.3	+0.52	3 56.7
27	18 18 11.63	1.816	23 28 53.4	0.56	3 53.5
28	18 18 55.44	1.836	23 28 39.5	0.60	3 50.3
29	18 19 39.73	1.855	23 28 24.6	0.64	3 47.1
30	18 20 24.48	1.874	23 28 8.6	0.68	3 43.9
31	18 21 9.69	+1.893	−23 27 51.7	+0.72	3 40.7
32	18 21 55.35	+1.912	−23 27 33.6	+0.77	3 37.6

Day of the Month.	2d.	10th.	18th.	26th.
Polar Semidiameter . .	17.″9	17.″5	17.″2	16.″8
Horizontal Parallax . .	1.7	1.6	1.6	1.6

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	18 21 55.35	+1.912	−23 27 33.6	+0.77	3 37.6
2	18 22 41.46	1.930	23 27 14.5	0.82	3 34.4
3	18 23 27.99	1.948	23 26 54.3	0.86	3 31.3
4	18 24 14.95	1.966	23 26 32.9	0.91	3 28.1
5	18 25 2.33	1.983	23 26 10.4	0.96	3 25.0
6	18 25 50.12	+2.000	−23 25 46.7	+1.01	3 21.8
7	18 26 38.32	2.017	23 25 21.8	1.06	3 18.7
8	18 27 26.91	2.033	23 24 55.7	1.11	3 15.5
9	18 28 15.89	2.049	23 24 28.4	1.16	3 12.4
10	18 29 5.26	2.065	23 23 59.9	1.21	3 9.3
11	18 29 55.00	+2.080	−23 23 30.1	+1.27	3 6.2
12	18 30 45.11	2.096	23 22 59.1	1.32	3 3.1
13	18 31 35.59	2.111	23 22 26.8	1.37	3 0.1
14	18 32 26.43	2.126	23 21 53.2	1.43	2 57.0
15	18 33 17.62	2.141	23 21 18.2	1.48	2 53.9
16	18 34 9.16	+2.155	−23 20 42.0	+1.53	2 50.8
17	18 35 1.04	2.169	23 20 4.4	1.59	2 47.7
18	18 35 53.25	2.183	23 19 25.4	1.64	2 44.6
19	18 36 45.79	2.196	23 18 45.1	1.70	2 41.6
20	18 37 38.65	2.209	23 18 3.4	1.76	2 38.5
21	18 38 31.82	+2.222	−23 17 20.3	+1.82	2 35.5
22	18 39 25.30	2.234	23 16 35.7	1.88	2 32.4
23	18 40 19.07	2.246	23 15 49.8	1.94	2 29.4
24	18 41 13.13	2.258	23 15 2.5	2.00	2 26.4
25	18 42 7.47	2.270	23 14 13.7	2.06	2 23.3
26	18 43 2.08	+2.281	−23 13 23.4	+2.13	2 20.3
27	18 43 56.96	2.292	23 12 31.6	2.19	2 17.3
28	18 44 52.10	2.303	23 11 38.4	2.25	2 14.3
29	18 45 47.50	2.313	23 10 43.7	2.31	2 11.3
30	18 46 43.13	2.323	23 9 47.5	2.37	2 8.3
31	18 47 39.01	+2.333	−23 8 49.8	+2.43	2 5.3
32	18 48 35.11	+2.342	−23 7 50.6	+2.50	2 2.3

Day of the Month.	3d.	11th.	19th.	27th.
Polar Semidiameter . .	16″.5	16″.2	16″.0	15″.8
Horizontal Parallax . .	1.6	1.5	1.5	1.5

DECEMBER.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	18 47 39.01	+2.333	−23 8 49.8	+2.43	2 5.3
2	18 48 35.11	2.342	23 7 50.6	2.50	2 2.3
3	18 49 31.43	2.351	23 6 49.8	2.56	1 59.3
4	18 50 27.97	2.360	23 5 47.6	2.62	1 56.3
5	18 51 24.71	2.369	23 4 43.9	2.69	1 53.3
6	18 52 21.66	+2.377	−23 3 38.6	+2.75	1 50.3
7	18 53 18.80	2.385	23 2 31.8	2.81	1 47.4
8	18 54 16.13	2.393	23 1 23.4	2.88	1 44.4
9	18 55 13.65	2.401	23 0 13.5	2.94	1 41.4
10	18 56 11.35	2.408	22 59 2.1	3.00	1 38.4
11	18 57 9.22	+2.415	−22 57 49.1	+3.07	1 35.4
12	18 58 7.26	2.422	22 56 34.6	3.13	1 32.5
13	18 59 5.46	2.429	22 55 18.5	3.19	1 29.5
14	19 0 3.81	2.435	22 54 0.9	3.26	1 26.5
15	19 1 2.32	2.441	22 52 41.7	3.32	1 23.5
16	19 2 0.97	+2.447	−22 51 21.0	+3.39	1 20.6
17	19 2 59.75	2.452	22 49 58.7	3.46	1 17.6
18	19 3 58.67	2.457	22 48 34.8	3.52	1 14.6
19	19 4 57.71	2.462	22 47 9.4	3.59	1 11.7
20	19 5 56.86	2.467	22 45 42.5	3.66	1 8.7
21	19 6 56.13	+2.472	−22 44 14.0	+3.72	1 5.8
22	19 7 55.50	2.476	22 42 43.9	3.79	1 2.8
23	19 8 54.96	2.480	22 41 12.4	3.85	0 59.9
24	19 9 54.52	2.483	22 39 39.3	3.92	0 56.9
25	19 10 54.15	2.486	22 38 4.6	3.98	0 54.0
26	19 11 53.86	+2.489	−22 36 28.5	+4.04	0 51.0
27	19 12 53.64	2.492	22 34 50.8	4.11	0 48.1
28	19 13 53.47	2.494	22 33 11.7	4.17	0 45.2
29	19 14 53.36	2.496	22 31 31.0	4.23	0 42.3
30	19 15 53.30	2.498	22 29 48.9	4.29	0 39.4
31	19 16 53.27	+2.500	−22 28 5.2	+4.35	0 36.4
32	19 17 53.28	+2.501	−22 26 20.2	+4.41	0 33.5

Day of the Month.	5th.	13th.	21st.	29th.	37th.
Polar Semidiameter . .	15″.6	15″.5	15″.4	15″.4	15″.3
Horizontal Parallax . .	1.5	1.5	1.4	1.4	1.4

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	9 28 52.41	−0.531	+16 0 16.6	+3.00	14 41.0	1	9 20 13.09	−0.803	+16 45 36.4	+3.98	12 30.5
2	9 28 39.49	0.545	16 1 29.3	3.06	14 36.9	2	9 19 53.80	0.805	16 47 11.9	3.97	12 26.2
3	9 28 26.24	0.559	16 2 43.4	3.12	14 32.7	3	9 19 34.47	0.806	16 48 47.2	3.97	12 22.0
4	9 28 12.65	0.573	16 3 59.0	3.18	14 28.6	4	9 19 15.11	0.807	16 50 22.5	3.96	12 17.7
5	9 27 58.75	0.586	16 5 15.9	3.23	14 24.4	5	9 18 55.73	0.808	16 51 57.5	3.95	12 13.5
6	9 27 44.53	−0.599	+16 6 34.2	+3.28	14 20.2	6	9 18 36.34	−0.808	+16 53 32.2	+3.94	12 9.2
7	9 27 30.00	0.612	16 7 53.7	3.33	14 16.1	7	9 18 16.96	0.807	16 55 6.6	3.93	12 4.9
8	9 27 15.17	0.624	16 9 14.5	3.38	14 11.9	8	9 17 57.60	0.806	16 56 40.7	3.91	12 0.7
9	9 27 0.06	0.636	16 10 36.5	3.43	14 7.7	9	9 17 38.26	0.805	16 58 14.3	3.89	11 56.5
10	9 26 44.66	0.647	16 11 59.5	3.48	14 3.5	10	9 17 18.97	0.803	16 59 47.5	3.87	11 52.2
11	9 26 29.00	−0.658	+16 13 23.7	+3.53	13 59.3	11	9 16 59.72	−0.801	+17 1 20.1	+3.85	11 48.0
12	9 26 13.06	0.669	16 14 49.0	3.57	13 55.1	12	9 16 40.53	0.798	17 2 52.2	3.83	11 43.7
13	9 25 56.87	0.679	16 16 15.2	3.61	13 50.9	13	9 16 21.41	0.795	17 4 23.6	3.80	11 39.5
14	9 25 40.44	0.689	16 17 42.4	3.65	13 46.7	14	9 16 2.38	0.791	17 5 54.3	3.77	11 35.2
15	9 25 23.77	0.699	16 19 10.5	3.69	13 42.5	15	9 15 43.44	0.787	17 7 24.4	3.74	11 31.0
16	9 25 6.87	−0.708	+16 20 39.5	+3.72	13 38.3	16	9 15 24.60	−0.783	+17 8 53.7	+3.71	11 26.7
17	9 24 49.75	0.717	16 22 9.2	3.75	13 34.1	17	9 15 5.87	0.778	17 10 22.3	3.68	11 22.5
18	9 24 32.42	0.726	16 23 39.6	3.78	13 29.8	18	9 14 47.26	0.773	17 11 49.9	3.64	11 18.2
19	9 24 14.89	0.734	16 25 10.8	3.81	13 25.6	19	9 14 28.78	0.767	17 13 16.7	3.60	11 14.0
20	9 23 57.17	0.742	16 26 42.7	3.84	13 21.4	20	9 14 10.45	0.761	17 14 42.6	3.56	11 9.8
21	9 23 39.26	−0.750	+16 28 15.1	+3.86	13 17.1	21	9 13 52.27	−0.754	+17 16 7.5	+3.52	11 5.5
22	9 23 21.18	0.757	16 29 48.0	3.88	13 12.9	22	9 13 34.25	0.747	17 17 31.4	3.48	11 1.3
23	9 23 2.93	0.764	16 31 21.5	3.90	13 8.7	23	9 13 16.40	0.740	17 18 54.2	3.43	10 57.1
24	9 22 44.53	0.770	16 32 55.5	3.92	13 4.4	24	9 12 58.74	0.732	17 20 15.9	3.38	10 52.9
25	9 22 25.98	0.776	16 34 29.8	3.94	13 0.2	25	9 12 41.27	0.724	17 21 36.5	3.33	10 48.6
26	9 22 7.30	−0.781	+16 36 4.4	+3.95	12 56.0	26	9 12 24.00	−0.715	+17 22 55.9	+3.28	10 44.4
27	9 21 48.51	0.786	16 37 39.3	3.96	12 51.7	27	9 12 6.95	0.706	17 24 14.1	3.23	10 40.2
28	9 21 29.60	0.790	16 39 14.5	3.97	12 47.5	28	9 11 50.12	0.696	17 25 31.1	3.18	10 36.0
29	9 21 10.59	0.794	16 40 49.8	3.97	12 43 2	29	9 11 33.53	0.686	17 26 46.7	3.12	10 31.8
30	9 20 51.50	0.797	16 42 25.3	3.98	12 39.0	30	9 11 17.18	0.676	17 28 1.0	3.07	10 27.6
31	9 20 32.33	−0.800	+16 44 0.9	+3.98	12 34.7	31	9 11 1.08	−0.665	+17 29 14.0	+3.01	10 23.4
32	9 20 13.09	−0.803	+16 45 36.4	+3.98	12 30.5	32	9 10 45.24	−0.654	+17 30 25.6	+2.95	10 19.2

Day of the Month.	3d.	11th.	19th.	27th.	Day of the Month.	4th.	12th.	20th.	28th.
Polar Semidiameter . .	9.″4	9.″4	9.″5	9.″5	Polar Semidiameter . .	9.″6	9.″6	9.″5	9.″5
Horizontal Parallax . .	1.1	1.1	1.1	1.1	Horizontal Parallax . .	1.1	1.1	1.1	1.1

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	9 11 33.53	−0.686	+17 26 46.7	+3.12	10 31.8	1	9 5 36.40	−0.236	+17 52 47.7	+0.95	8 24.1
2	9 11 17.18	0.676	17 28 1.0	3.07	10 27.6	2	9 5 30.96	0.218	17 53 9.5	0.87	8 20.1
3	9 11 1.08	0.665	17 29 14.0	3.01	10 23.4	3	9 5 25.94	0.200	17 53 29.5	0.79	8 16.0
4	9 10 45.24	0.654	17 30 25.6	2.95	10 19.2	4	9 5 21.35	0.182	17 53 47.5	0.71	8 12.0
5	9 10 29.68	0.643	17 31 35.8	2.89	10 15.0	5	9 5 17.19	0.164	17 54 3.6	0.63	8 8.0
6	9 10 14.39	−0.631	+17 32 44.5	+2.83	10 10.8	6	9 5 13.47	−0.146	+17 54 17.8	+0.55	8 4.0
7	9 9 59.39	0.619	17 33 51.7	2.77	10 6.6	7	9 5 10.17	0.128	17 54 30.1	0.47	8 0.1
8	9 9 44.69	0.607	17 34 57.5	2.71	10 2.5	8	9 5 7.31	0.110	17 54 40.5	0.39	7 56.1
9	9 9 30.29	0.594	17 36 1.7	2.65	9 58.3	9	9 5 4.88	0.092	17 54 48.9	0.31	7 52.1
10	9 9 16.20	0.581	17 37 4.3	2.58	9 54.1	10	9 5 2.89	0.074	17 54 55.4	0.23	7 48.1
11	9 9 2.42	−0.568	+17 38 5.3	+2.51	9 50.0	11	9 5 1.32	−0.056	+17 55 0.0	+0.15	7 44.2
12	9 8 48.97	0.554	17 39 4.7	2.44	9 45.8	12	9 5 0.20	0.038	17 55 2.7	+0.07	7 40.2
13	9 8 35.85	0.540	17 40 2.5	2.37	9 41.7	13	9 4 59.50	0.020	17 55 3.5	−0.01	7 36.3
14	9 8 23.06	0.526	17 40 58.6	2.30	9 37.5	14	9 4 59.24	−0.002	17 55 2.4	0.09	7 32.4
15	9 8 10.62	0.512	17 41 53.0	2.23	9 33.4	15	9 4 59.42	+0.016	17 54 59.4	0.16	7 28.4
16	9 7 58.53	−0.497	+17 42 45.8	+2.16	9 29.3	16	9 5 0.03	+0.034	+17 54 54.5	−0.24	7 24.5
17	9 7 46.79	0.482	17 43 36.9	2.09	9 25.1	17	9 5 1.07	0.052	17 54 47.7	0.32	7 20.6
18	9 7 35.40	0.467	17 44 26.2	2.02	9 21.0	18	9 5 2.54	0.070	17 54 39.0	0.40	7 16.7
19	9 7 24.38	0.452	17 45 13.8	1.95	9 16.9	19	9 5 4.45	0.088	17 54 28.4	0.48	7 12.8
20	9 7 13.73	0.437	17 45 59.6	1.88	9 12.8	20	9 5 6.79	0.106	17 54 16.0	0.56	7· 8.9
21	9 7 3.45	−0.421	+17 46 43.7	+1.80	9 8.7	21	9 5 9.55	+0.124	+17 54 1.6	−0.64	7 5.0
22	9 6 53.55	0.405	17 47 25.9	1.73	9 4.6	22	9 5 12.75	0.142	17 53 45.4	0.72	7 1.1
23	9 6 44.04	0.389	17 48 6.4	1.66	9 0.5	23	9 5 16.38	0.160	17 53 27.3	0.80	6 57.3
24	9 6 34.91	0.373	17 48 45.1	1.58	8 56.4	24	9 5 20.44	0.178	17 53 7.4	0.88	6 53.4
25	9 6 26.18	0.356	17 49 21.9	1.50	8 52.4	25	9 5 24.93	0.196	17 52 45.6	0.95	6 49.5
26	9 6 17.84	−0.339	+17 49 56.9	+1.42	8 48.3	26	9 5 29.85	+0.214	+17 52 22.0	−1.03	6 45.7
27	9 6 9.91	0.322	17 50 30.0	1.35	8 44.3	27	9 5 35.19	0.231	17 51 56.5	1.11	6 41.9
28	9 6 2.38	0.305	17 51 1.3	1.27	8 40.2	28	9 5 40.96	0.249	17 51 29.1	1.19	6 38.0
29	9 5 55.26	0.288	17 51 30.7	1.19	8 36.2	29	9 5 47.15	0.267	17 51 0.0	1.26	6 34.2
30	9 5 48.56	0.271	17 51 58.3	1.11	8 32.1	30	9 5 53.76	0.284	17 50 28.9	1.33	6 30.4
31	9 5 42.27	−0.253	+17 52 23.9	+1.03	8 28.1	31	9 6 0.79	+0.302	+17 49 56.1	−1.41	6 26.6
32	9 5 36.40	−0.236	+17 52 47.7	+0.95	8 24.1	32	9 6 8.24	+0.319	+17 49 21.4	−1.49	6 22.8

Day of the Month.	8th.	16th.	24th.	Day of the Month.	1st.	9th.	17th.	25th.
Polar Semidiameter	9″.4	9″.3	9″.2	Polar Semidiameter . .	9″.1	8″.9	8″.8	8″.7
Horizontal Parallax	1.1	1.1	1.0	Horizontal Parallax . .	1.0	1.0	1.0	1.0

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

MAY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	9 6 0.79	+0.302	+17 49 56.1	−1.41	6 26.6
2	9 6 8.24	0.319	17 49 21.4	1.49	6 22.8
3	9 6 16.10	0.336	17 48 45.0	1.56	6 19.0
4	9 6 24.38	0.353	17 48 6.8	1.63	6 15.2
5	9 6 33.06	0.370	17 47 26.8	1.70	6 11.4
6	9 6 42.15	+0.387	+17 46 45.0	−1.78	6 7.6
7	9 6 51.65	0.404	17 46 1.5	1.86	6 3.8
8	9 7 1.55	0.421	17 45 16.2	1.93	6 0.1
9	9 7 11.83	0.437	17 44 29.2	2.00	5 56.3
10	9 7 22.51	0.453	17 43 40.5	2.07	5 52.6
11	9 7 33.58	+0.469	+17 42 50.0	−2.14	5 48.8
12	9 7 45.04	0.485	17 41 57.9	2.21	5 45.1
13	9 7 56.88	0.501	17 41 4.0	2.28	5 41.3
14	9 8 9.09	0.517	17 40 8.5	2.35	5 37.6
15	9 8 21.68	0.532	17 39 11.3	2.42	5 33.9
16	9 8 34.65	+0.548	+17 38 12.5	−2.49	5 30.2
17	9 8 47.98	0.563	17 37 12.0	2.56	5 26.5
18	9 9 1.68	0.578	17 36 9.9	2.63	5 22.8
19	9 9 15.74	0.593	17 35 6.2	2.69	5 19.1
20	9 9 30.16	0.608	17 34 0.9	2.75	5 15.4
21	9 9 44.93	+0.623	+17 32 54.0	−2.82	5 11.7
22	9 10 0.06	0.638	17 31 45.5	2.89	5 8.0
23	9 10 15.54	0.653	17 30 35.4	2.96	5 4.3
24	9 10 31.37	0.667	17 29 23.7	3.02	5 0.6
25	9 10 47.54	0.681	17 28 10.5	3.08	4 57.0
26	9 11 4.04	+0.695	+17 26 55.8	−3.15	4 53.3
27	9 11 20.89	0.709	17 25 39.5	3.22	4 49.7
28	9 11 38.07	0.723	17 24 21.7	3.28	4 46.0
29	9 11 55.57	0.736	17 23 2.4	3.34	4 42.4
30	9 12 13.39	0.749	17 21 41.6	3.40	4 38.7
31	9 12 31.54	+0.763	+17 20 19.3	−3.46	4 35.1
32	9 12 50.01	+0.776	+17 18 55.5	−3.52	4 31.5

Day of the Month.	3d.	11th.	19th.	27th.
	″	″	″	″
Polar Semidiameter . .	8.6	8.5	8.3	8.2
Horizontal Parallax . .	1.0	1.0	0.9	0.9

JUNE.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	9 12 50.01	+0.776	+17 18 55.5	−3.52	4 31.5
2	9 13 8.78	0.789	17 17 30.3	3.58	4 27.9
3	9 13 27.86	0.802	17 16 3.7	3.64	4 24.3
4	9 13 47.24	0.814	17 14 35.6	3.70	4 20.7
5	9 14 6.92	0.826	17 13 6.1	3.76	4 17.1
6	9 14 26.89	+0.838	+17 11 35.3	−3.82	4 13.5
7	9 14 47.15	0.850	17 10 3.1	3.88	4 9.9
8	9 15 7.69	0.862	17 8 29.5	3.93	4 6.3
9	9 15 28.51	0.874	17 6 54.6	3.98	4 2.7
10	9 15 49.60	0.885	17 5 18.4	4.04	3 59.1
11	9 16 10.96	+0.896	+17 3 40.8	−4.10	3 55.5
12	9 16 32.60	0.907	17 2 1.9	4.15	3 52.0
13	9 16 54.49	0.918	17 0 21.8	4.20	3 48.4
14	9 17 16.63	0.928	16 58 40.4	4.25	3 44.8
15	9 17 39.03	0.939	16 56 57.7	4.31	3 41.2
16	9 18 1.69	+0.949	+16 55 13.8	−4.36	3 37.7
17	9 18 24.58	0.959	16 53 28.6	4.41	3 34.1
18	9 18 47.72	0.969	16 51 42.3	4.46	3 30.6
19	9 19 11.10	0.979	16 49 54.7	4.51	3 27.0
20	9 19 34.71	0.989	16 48 6.0	4.56	3 23.5
21	9 19 58.55	+0.999	+16 46 16.1	−4.61	3 19.9
22	9 20 22.62	1.008	16 44 25.0	4.66	3 16.4
23	9 20 46.91	1.017	16 42 32.8	4.71	3 12.9
24	9 21 11.43	1.026	16 40 39.4	4.75	3 9.4
25	9 21 36.15	1.035	16 38 44.9	4.80	3 5.9
26	9 22 1.09	+1.043	+16 36 49.3	−4.84	3 2.3
27	9 22 26.22	1.052	16 34 52.6	4.89	2 58.8
28	9 22 51.57	1.060	16 32 54.9	4.93	2 55.3
29	9 23 17.11	1.068	16 30 56.1	4.97	2 51.8
30	9 23 42.84	1.076	16 28 56.2	5.01	2 48.3
31	9 24 8.75	+1.084	+16 26 55.4	−5.06	2 44.8
32	9 24 34.86	+1.091	+16 24 53.5	−5.10	2 41.3

Day of the Month.	4th.	12th.	20th.	28th.
	″	″	″	″
Polar Semidiameter . .	8.1	8.0	7.9	7.9
Horizontal Parallax . .	0.9	0.9	0.9	0.9

NOTE.—The sign + indicates north declinations: the sign — indicates south declinations.

GREENWICH MEAN TIME.

JULY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	9 24 8.75	+1.084	+16 26 55.4	−5.06	2 44.8
2	9 24 34.86	1.091	16 24 53.5	5.10	2 41.3
3	9 25 1.14	1.098	16 22 50.6	5.14	2 37.9
4	9 25 27.59	1.105	16 20 46.8	5.18	2 34.4
5	9 25 54.20	1.112	16 18 42.1	5.22	2 30.9
6	9 26 20.98	+1.119	+16 16 36.3	−5.26	2 27.4
7	9 26 47.93	1.126	16 14 29.7	5.30	2 23.9
8	9 27 15.02	1.132	16 12 22.2	5.34	2 20.4
9	9 27 42.27	1.138	16 10 13.9	5.37	2 16.9
10	9 28 9.66	1.144	16 8 4.6	5.41	2 13.4
11	9 28 37.19	+1.150	+16 5 54.5	−5.45	2 9.9
12	9 29 4.86	1.156	16 3 43.6	5.48	2 6.4
13	9 29 32.67	1.162	16 1 31.9	5.51	2 3.0
14	9 30 0.61	1.167	15 59 19.4	5.54	1 59.5
15	9 30 28.67	1.172	15 57 6.1	5.57	1 56.1
16	9 30 56.86	+1.177	+15 54 52.1	−5.60	1 52.6
17	9 31 25.16	1.182	15 52 37.3	5.63	1 49.2
18	9 31 53.59	1.187	15 50 21.8	5.66	1 45.7
19	9 32 22.12	1.192	15 48 5.5	5.69	1 42.3
20	9 32 50.76	1.196	15 45 48.6	5.72	1 38.8
21	9 33 19.51	+1.200	+15 43 31.0	−5.75	1 35.4
22	9 33 48.36	1.204	15 41 12.7	5.78	1 31.9
23	9 34 17.30	1.208	15 38 53.7	5.81	1 28.5
24	9 34 46.33	1.212	15 36 34.2	5.83	1 25.0
25	9 35 15.45	1.216	15 34 14.0	5.86	1 21.6
26	9 35 44.66	+1.219	+15 31 53.3	−5.88	1 18.1
27	9 36 13.95	1.222	15 29 32.0	5.90	1 14.7
28	9 36 43.30	1.225	15 27 10.1	5.92	1 11.2
29	9 37 12.73	1.227	15 24 47.7	5.94	1 7.8
30	9 37 42.23	1.230	15 22 24.8	5.96	1 4.3
31	9 38 11.78	+1.233	+15 20 1.4	−5.98	1 0.9
32	9 38 41.39	+1.235	+15 17 37.6	−6.00	0 57.4

Day of the Month.	6th.	14th.	22d.	30th.
Polar Semidiameter . .	7.″8	7.″8	7.″7	7.″7
Horizontal Parallax . .	0.9	0.9	0.9	0.9

AUGUST.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	9 38 41.39	+1.235	+15 17 37.6	−6.00	0 57.4
2	9 39 11.04	1.237	15 15 13.4	6.02	0 54.0
3	9 39 40.75	1.239	15 12 48.7	6.04	0 50.5
4	9 40 10.50	1.240	15 10 23.6	6.06	0 47.1
5	9 40 40.29	1.242	15 7 58.1	6.08	0 43.7
6	9 41 10.11	+1.243	+15 5 32.3	−6.09	0 40.3
7	9 41 39.96	1.244	15 3 6.2	6.10	0 36.8
8	9 42 9.84	1.245	15 0 39.7	6.11	0 33.4
9	9 42 39.74	1.246	14 58 12.9	6.12	0 29.9
10	9 43 9.66	1.247	14 55 45.9	6.13	0 26.5
11	9 43 39.60	+1.247	+14 53 18.6	−6.14	0 23.0
12	9 44 9.54	1.248	14 50 51.1	6.15	0 19.6
13	9 44 39.50	1.248	14 48 23.3	6.16	0 16.2
14	9 45 9.45	1.248	14 45 55.4	6.16	0 12.8
15	9 45 39.42	1.248	14 43 27.2	6.17	0 9.3
16	9 46 9.38	+1.248	+14 40 59.0	−6.17	0 5.9
17	9 46 39.33	1.248	14 38 30.6	6.18	0 2.4 23 59.0
18	9 47 9.27	1.247	14 36 2.1	6.19	23 55.6
19	9 47 39.20	1.247	14 33 33.4	6.19	23 52.2
20	9 48 9.11	1.246	14 31 4.7	6.19	23 48.7
21	9 48 39.00	+1.245	+14 28 36.0	−6.20	23 45.3
22	9 49 8.85	1.244	14 26 7.2	6.20	23 41.8
23	9 49 38.68	1.243	14 23 38.4	6.20	23 38.4
24	9 50 8.48	1.241	14 21 9.6	6.20	23 34.9
25	9 50 38.23	1.239	14 18 40.9	6.19	23 31.5
26	9 51 7.94	+1.237	+14 16 12.3	−6.19	23 28.0
27	9 51 37.60	1.235	14 13 43.7	6.18	23 24.6
28	9 52 7.20	1.232	14 11 15.3	6.18	23 21.2
29	9 52 36.75	1.230	14 8 47.0	6.17	23 17.8
30	9 53 6.23	1.227	14 6 18.9	6.17	23 14.3
31	9 53 35.65	+1.224	+14 3 51.0	−6.16	23 10.9
32	9 54 4.99	+1.221	+14 1 23.3	−6.15	23 7.5

Day of the Month.	7th.	15th.	23d.	31st.
Polar Semidiameter . .	7.″7	7.″7	7.″7	7.″7
Horizontal Parallax . .	0.9	0.9	0.9	0.9

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign — indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.	Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	9 54 4.99	+1.221	+14 1 23.3	−6.15	23 7.5	1	10 7 52.59	+1.052	+12 51 19.5	−5.37	21 23.1
2	9 54 34.26	1.218	13 58 55.9	6.14	23 4.0	2	10 8 17.73	1.044	12 49 11.2	5.32	21 19.6
3	9 55 3.44	1.214	13 56 28.8	6.13	23 0.5	3	10 8 42.66	1.035	12 47 4.0	5.28	21 16.1
4	9 55 32.55	1.211	13 54 1.9	6.12	22 57.1	4	10 9 7.39	1.026	12 44 58.0	5.24	21 12.6
5	9 56 1.57	1.207	13 51 35.4	6.11	22 53.6	5	10 9 31.90	1.017	12 42 53.0	5.19	21 9.0
6	9 56 30.50	+1.203	+13 49 9.2	−6.09	22 50.2	6	10 9 56.20	+1.008	+12 40 49.2	−5.14	21 5.5
7	9 56 59.33	1.199	13 46 43.4	6.07	22 46.7	7	10 10 20.28	0.999	12 38 46.5	5.09	21 2.0
8	9 57 28.07	1.195	13 44 18.0	6.05	22 43.3	8	10 10 44.13	0.990	12 36 45.0	5.04	20 58.5
9	9 57 56.70	1.191	13 41 53.0	6.03	22 39.8	9	10 11 7.76	0.980	12 34 44.8	4.99	20 54.9
10	9 58 25.22	1.187	13 39 28.4	6.01	22 36.3	10	10 11 31.16	0.970	12 32 45.8	4.94	20 51.4
11	9 58 53.63	+1.182	+13 37 4.3	−5.99	22 32.8	11	10 11 54.33	+0.960	+12 30 48.1	−4.88	20 47.9
12	9 59 21.94	1.177	13 34 40.7	5.97	22 29.4	12	10 12 17.25	0.950	12 28 51.7	4.82	20 44.3
13	9 59 50.13	1.172	13 32 17.6	5.95	22 25.9	13	10 12 39.93	0.940	12 26 56.6	4.77	20 40.7
14	10 0 18.19	1.167	13 29 55.0	5.93	22 22.5	14	10 13 2.37	0.930	12 25 2.8	4.71	20 37.2
15	10 0 46.13	1.161	13 27 33.0	5.91	22 19.0	15	10 13 24.56	0.919	12 23 10.4	4.65	20 33.6
16	10 1 13.94	+1.156	+13 25 11.6	−5.88	22 15.6	16	10 13 46.49	+0.908	+12 21 19.5	−4.59	20 30.0
17	10 1 41.62	1.150	13 22 50.8	5.85	22 12.1	17	10 14 8.16	0.897	12 19 30.0	4.53	20 26.4
18	10 2 9.16	1.144	13 20 30.6	5.83	22 8.6	18	10 14 29.57	0.886	12 17 41.9	4.47	20 22.8
19	10 2 36.56	1.138	13 18 11.1	5.80	22 5.1	19	10 14 50.71	0.875	12 15 55.3	4.41	20 19.2
20	10 3 3.81	1.132	13 15 52.3	5.77	22 1.6	20	10 15 11.57	0.864	12 14 10.3	4.35	20 15.6
21	10 3 30.91	+1.126	+13 13 34.2	−5.74	21 58.1	21	10 15 32.15	+0.852	+12 12 26.8	−4.28	20 12.0
22	10 3 57.86	1.120	13 11 16.8	5.71	21 54.6	22	10 15 52.46	0.840	12 10 44.9	4.21	20 8.4
23	10 4 24.64	1.113	13 9 0.3	5.68	21 51.1	23	10 16 12.48	0.828	12 9 4.6	4.14	20 4.8
24	10 4 51.26	1.106	13 6 44.5	5.65	21 47.6	24	10 16 32.20	0.816	12 7 26.0	4.07	20 1.2
25	10 5 17.71	1.099	13 4 29.6	5.62	21 44.1	25	10 16 51.63	0.804	12 5 49.0	4.00	19 57.6
26	10 5 43.98	+1.091	+13 2 15.6	−5.59	21 40.6	26	10 17 10.76	+0.791	+12 4 13.7	−3.93	19 54.0
27	10 6 10.08	1.083	13 0 2.5	5.55	21 37.1	27	10 17 29.59	0.778	12 2 40.2	3.86	19 50.4
28	10 6 35.99	1.076	12 57 50.2	5.51	21 33.6	28	10 17 48.10	0.765	12 1 8.4	3.79	19 46.8
29	10 7 1.72	1.068	12 55 39.0	5.47	21 30.1	29	10 18 6.30	0.752	11 59 38.4	3.72	19 43.1
30	10 7 27.25	1.060	12 53 28.7	5.42	21 26.6	30	10 18 24.19	0.739	11 58 10.2	3.64	19 39.5
31	10 7 52.59	+1.052	+12 51 19.5	−5.37	21 23.1	31	10 18 41.76	+0.726	+11 56 43.8	−3.56	19 35.8
32	10 8 17.73	+1.044	+12 49 11.2	−5.32	21 19.6	32	10 18 59.00	+0.712	+11 55 19.3	−3.48	19 32.2

Day of the Month.	8th.	16th.	24th.	Day of the Month.	2d.	10th.	18th.	26th.
Polar Semidiameter	7″.7	7″.7	7″.8	Polar Semidiameter . .	7″.8	7″.9	8″.0	8″.1
Horizontal Parallax	0.9	0.9	0.9	Horizontal Parallax . .	0.9	0.9	0.9	0.9

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	10 18 59.00	+0.712	+11 55 19.3	−3.48	19 32.2
2	10 19 15.91	0.698	11 53 56.6	3.40	19 28.5
3	10 19 32.50	0.684	11 52 35.8	3.32	19 24.9
4	10 19 48.76	0.670	11 51 17.0	3.24	19 21.2
5	10 20 4.68	0.656	11 50 0.1	3.16	19 17.5
6	10 20 20.26	+0.642	+11 48 45.2	−3.08	19 13.8
7	10 20 35.50	0.628	11 47 32.2	3.00	19 10.1
8	10 20 50.39	0.613	11 46 21.2	2.92	19 6.4
9	10 21 4.93	0.599	11 45 12.3	2.84	19 2.7
10	10 21 19.11	0.584	11 44 5.4	2 75	18 59.0
11	10 21 32.95	+0.569	+11 43 0.6	−2.66	18 55.3
12	10 21 46.42	0.554	11 41 57.9	2.57	18 51.6
13	10 21 59.52	0.539	11 40 57.3	2.48	18 47.9
14	10 22 12.26	0.523	11 39 58.9	2.39	18 44.2
15	10 22 24.63	0.508	11 39 2.6	2.30	18 40.4
16	10 22 36.62	+0.492	+11 38 8.5	−2.21	18 36.7
17	10 22 48.23	0.476	11 37 16.6	2.12	18 32.9
18	10 22 59.46	0.460	11 36 26.9	2.03	18 29.2
19	10 23 10.31	0.444	11 35 39.4	1.94	18 25.4
20	10 23 20.77	0.428	11 34 54.2	1.84	18 21.7
21	10 23 30.84	+0.412	+11 34 11.3	−1.74	18 17.9
22	10 23 40.50	0.395	11 33 30.8	1.65	18 14.2
23	10 23 49.78	0.378	11 32 52.5	1.55	18 10.4
24	10 23 58.66	0.361	11 32 16.5	1.45	18 6.6
25	10 24 7.13	0.344	11 31 43.0	1.35	18 2.8
26	10 24 15.19	+0.327	+11 31 11.8	−1.25	17 59.0
27	10 24 22.85	0.310	11 30 42.9	1.15	17 55.2
28	10 24 30.10	0.293	11 30 16.4	1.05	17 51.3
29	10 24 36.93	0.276	11 29 52.4	0.95	17 47.5
30	10 24 43.36	0.259	11 29 30.7	0.85	17 43.7
31	10 24 49.37	+0.242	+11 29 11.4	−0.75	17 39.9
32	10 24 54.97	+0.225	+11 28 54.6	−0.65	17 36.0

Day of the Month.	3d.	11th.	19th.	27th.
Polar Semidiameter . .	8″.2	8″.3	8″.4	8″.5
Horizontal Parallax . .	0.9	0.9	1.0	1.0

DECEMBER.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m
1	10 24 49.37	+0.242	+11 29 11.4	−0.75	17 39.9
2	10 24 54.97	0.225	11 28 54.6	0.65	17 36.0
3	10 25 0.16	0.208	11 28 40.1	0.55	17 32.2
4	10 25 4.92	0.191	11 28 28.1	0.45	17 28.3
5	10 25 9.27	0.173	11 28 18.5	0.35	17 24.4
6	10 25 13.20	+0.156	+11 28 11.4	−0.25	17 20.6
7	10 25 16.71	0.138	11 28 6.7	0.15	17 16.7
8	10 25 19.80	0.120	11 28 4.4	−0.05	17 12.8
9	10 25 22.47	0.103	11 28 4.6	+0.05	17 8.9
10	10 25 24.72	0.085	11 28 7.2	0.16	17 5.0
11	10 25 26.54	+0.067	+11 28 12.2	+0.26	17 1.1
12	10 25 27.94	0.050	11 28 19.7	0.37	16 57.2
13	10 25 28.91	0.032	11 28 29.6	0.47	16 53.3
14	10 25 29.46	+0.014	11 28 42.0	0.57	16 49.3
15	10 25 29.58	−0.003	11 28 56.9	0.67	16 45.4
16	10 25 29 27	−0.021	+11 29 14.1	+0.77	16 41.5
17	10 25 28.54	0.039	11 29 33.8	0.87	16 37.5
18	10 25 27.38	0.057	11 29 56.0	0.97	16 33.6
19	10 25 25.79	0.075	11 30 20.6	1.07	16 29.6
20	10 25 23.78	0.093	11 30 47.5	1.17	16 25.6
21	10 25 21.34	−0.111	+11 31 16.9	+1.27	16 21.7
22	10 25 18.48	0.129	11 31 48.7	1.37	16 17.7
23	10 25 15.20	0.146	11 32 22.9	1.47	16 13.7
24	10 25 11.50	0.163	11 32 59.4	1.57	16 9.7
25	10 25 7.38	0.180	11 33 38.2	1.67	16 5.7
26	10 25 2.84	−0.197	+11 34 19.4	+1.76	16 1.7
27	10 24 57.90	0.214	11 35 2.9	1.86	15 57.6
28	10 24 52.55	0.231	11 35 48.7	1.96	15 53.6
29	10 24 46.79	0.248	11 36 36.8	2.05	15 49.6
30	10 24 40.63	0.265	11 37 27.1	2.14	15 45.6
31	10 24 34.07	−0.281	+11 38 19.6	+2.23	15 41.5
32	10 24 27.11	−0.298	+11 39 14.2	+2.32	15 37.5

Day of the Month.	5th.	13th.	21st.	29th.	37th.
Polar Semidiameter . .	8″.7	8″.8	8″.9	9″.0	9″.1
Horizontal Parallax . .	1.0	1.0	1.0	1.0	1.0

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The — sign indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

Month and Day.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Day. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Day. Noon.	Meridian Passage.	Month and Day.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Day. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Day. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
Jan. 3	13 21 22.96	+4.702	−7 54 4.8	−26.25	18 25.2	July 2	13 6 55.56	+1.322	−6 27 1.6	−10.72	6 23.0
7	13 21 40.13	3.883	7 55 40.0	21.31	18 9.8	6	13 7 2.43	2.108	6 27 54.1	15.55	6 7.4
11	13 21 54.00	3.053	7 56 55.2	16.31	17 54.3	10	13 7 12.41	2.884	6 29 5.8	20.31	5 51.9
15	13 22 4.54	2.217	7 57 50.5	11.31	17 38.7	14	13 7 25.49	3.651	6 30 36.4	24.98	5 36.4
19	13 22 11.73	1.376	7 58 25.7	6.29	17 23.1	18	13 7 41.61	4.408	6 32 25.5	29.58	5 20.9
23	13 22 15.54	+0.531	−7 58 40.8	− 1.27	17 7.4	22	13 8 0.74	+5.155	−6 34 32.9	−34.10	5 5.5
27	13 22 15.98	−0.314	7 58 35.9	+ 3.74	16 51.7	26	13 8 22.83	5.889	6 36 58.2	38.52	4 50.1
31	13 22 13.04	1.153	7 58 11.0	8.71	16 35.9	30	13 8 47.82	6.603	6 39 40.9	42.82	4 34.8
Feb. 4	13 22 6.77	1.978	7 57 26.4	13.58	16 20.0	Aug. 3	13 9 15.62	7.293	6 42 40.5	46.95	4 19.5
8	13 21 57.25	2.781	7 56 22.5	18.32	16 4.1	7	13 9 46.13	7.957	6 45 56.3	50.90	4 4.3
12	13 21 44.57	−3.557	−7 55 0.0	+22.90	15 48.2	11	13 10 19.23	+8.593	−6 49 27.5	−54.67	3 49.1
16	13 21 28.84	4.305	7 53 19.6	27.29	15 32.2	15	13 10 54.83	9.204	6 53 13.4	58.25	3 34.0
20	13 21 10.17	5 024	7 51 21.9	31.50	15 16.2	19	13 11 32.83	9.790	6 57 13.2	61.65	3 18.9
24	13 20 48.69	5.708	7 49 7.9	35.50	15 0.1	23	13 12 13.11	10.347	7 1 26.3	64.88	3 3.9
28	13 20 24.56	6.352	7 46 38.2	39.27	14 43.9	27	13 12 55.56	10.872	7 5 51.9	67.89	2 48.8
Mar. 4	13 19 57.95	−6.947	−7 43 54.1	+42.75	14 27.8	31	13 13 40.04	11.360	−7 10 29.1	−70.66	2 33.8
8	13 19 29.06	7.487	7 40 56.7	45.90	14 11.6	Sept. 4	13 14 26.39	11.810	7 15 16.8	73.18	2 18.9
12	13 18 58.13	7.970	7 37 47.3	48.71	13 55.3	8	13 15 14.46	12.222	7 20 14.2	75.45	2 4.0
16	13 18 25.38	8.306	7 34 27.5	51.16	13 39.0	12	13 16 4.11	12.600	7 25 20.1	77.49	1 49.1
20	13 17 51.04	8.765	7 30 58.5	53.27	13 22.7	16	13 16 55.21	12.942	7 30 33.8	79.30	1 34.2
24	13 17 15.34	−9.074	−7 27 21.8	+55.03	13 6.4	20	13 17 47.60	13.246	−7 35 54.2	−80.88	1 19.3
28	13 16 38.51	9.320	7 23 38.8	56.41	12 50.1	24	13 18 41.13	13.511	7 41 20.5	82.21	1 4.5
Apr. 1	13 16 0.87	9.496	7 19 51.1	57.38	12 33.7	28	13 19 35.62	13.729	7 46 51.6	83.26	0 49.7
5	13 15 22.66	9.601	7 16 0.4	57.92	12 17.3	Oct. 2	13 20 30.90	13.903	7 52 26.2	84.01	0 34.9
9	13 14 44.16	9.637	7 12 8.4	58.02	12 1.0	6	13 21 26.79	14.033	7 58 3.3	84.50	0 20.1
13	13 14 5.65	−9.605	−7 8 16.8	+57.72	11 44.6	10	13 22 23.12	14.123	−8 3 41.8	−84.73	0 5.3
17	13 13 27.40	9.512	7 4 27.1	57.04	11 28.3	14	13 23 19.72	14.171	8 9 20.8	84.72	23 46.8
21	13 12 49.64	9.355	7 0 41.0	55.98	11 11.9	18	13 24 16.43	14.177	8 14 59.3	84.46	23 32.0
25	13 12 12.64	9.135	6 56 59.8	54.54	10 55.6	22	13 25 13.07	14.136	8 20 36.1	83.92	23 17.2
29	13 11 36.65	8.851	6 53 25.2	52.71	10 39.3	26	13 26 9.46	14.047	8 26 10.3	83.09	23 2.4
May 3	13 11 1.92	−8.502	−6 49 58.6	+50.49	10 23.0	30	13 27 5.38	13.909	−8 31 40.5	−81.98	22 47.6
7	13 10 28.70	8.096	6 46 41.7	47.91	10 6.7	Nov. 3	13 28 0.66	13.724	8 37 5.7	80.60	22 32.8
11	13 9 57.22	7.640	6 43 35.7	45.02	9 50.4	7	13 28 55.12	13.497	8 42 24.9	78.97	22 17.9
15	13 9 27.65	7.137	6 40 41.9	41.84	9 34.2	11	13 29 48.59	13.229	8 47 37.1	77.10	22 3.1
19	13 9 0.18	6.591	6 38 1.3	38.41	9 18.1	15	13 30 40.89	12.915	8 52 41.4	75.00	21 48.2
23	13 8 34.97	−6.003	−6 35 34.9	+34.73	9 1.9	19	13 31 31.84	12.555	−8 57 36.8	−72.64	21 33.3
27	13 8 12.20	5.374	6 33 23.8	30.80	8 45.8	23	13 32 21.27	12.147	9 2 22.1	70.00	21 18.4
31	13 7 52.03	4.707	6 31 28.8	26.64	8 29.7	27	13 33 8.96	11.693	9 6 56.4	67.12	21 3.5
June 4	13 7 34.58	4.010	6 29 50.9	22.28	8 13.7	Dec. 1	13 33 54.75	11.196	9 11 18.8	64.01	20 48.5
8	13 7 19.98	3.290	6 28 30.7	17.80	7 57.8	5	13 34 38.48	10.661	9 15 28.3	60.68	20 33.5
12	13 7 8.29	−2.553	−6 27 28.6	+13.21	7 41.9	9	13 35 20.00	10.090	−9 19 24.0	−57.18	20 18.5
16	13 6 59.57	1.801	6 26 45.1	8.54	7 26.0	13	13 35 59.15	+9.481	9 23 5.4	53.50	20 3.4
20	13 6 53.89	1.035	6 26 20.3	+ 3.80	7 10.2	17	13 36 35.79	8.834	9 26 31.7	49.59	19 48.2
24	13 6 51.31	−0.256	6 26 14.7	− 1.01	6 54.4	21	13 37 9.77	8.149	9 29 41.9	45.50	19 33.1
28	13 6 51.86	+0.531	6 26 28.4	5.86	6 38.7	25	13 37 40.94	7.430	9 32 35.5	41.24	19 17.9
July 2	13 6 55.56	+1.322	−6 27 1.6	−10.72	6 23.0	29	13 38 9.17	+6.681	−9 35 11.7	−36.83	19 2.6
6	13 7 2.43	+2.108	−6 27 54.1	−15.55	6 7.4	33	13 38 34.36	+5.911	−9 37 30.0	−32.31	18 47.3

Greatest horizontal parallax,	April 10, 0″.51.	Greatest semidiameter,	April 10, 1″.98.
Least horizontal parallax,	October 14, 0″.46.	Least semidiameter,	October 14, 1″.78.

GREENWICH MEAN TIME.

Month and Day.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.	Month and Day.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
Jan. 3	3 52 13.44	−4.693	+18 27 47.4	−11.55	8 57.5	July 2	4 6 56.92	+7.811	+19 16 20.9	+19.55	21 20.7
7	3 51 55.55	4.250	18 27 4.2	10.05	8 41.5	6	4 7 27.55	7.498	19 17 36.9	18.43	21 5.5
11	3 51 39.47	3.785	18 26 27.2	8.47	8 25.5	10	4 7 56.87	7.159	19 18 48.3	17.27	20 50.2
15	3 51 25.30	3.297	18 25 56.6	6.83	8 9.6	14	4 8 24.79	6.796	19 19 55.0	16.07	20 34.9
19	3 51 13.12	2.789	18 25 32.6	5.16	7 53.6	18	4 8 51.21	6.411	19 20 56.8	14.82	20 19.6
23	3 51 3.01	−2.263	+18 25 15.4	− 3.43	7 37.7	22	4 9 16.05	+6.003	+19 21 53.5	+13.53	20 4.3
27	3 50 55.04	1.718	18 25 5.2	− 1.67	7 21.9	26	4 9 39.20	5.570	19 22 45.0	12.21	19 49.0
31	3 50 49.28	1.163	18 25 2.1	+ 0.13	7 6.1	30	4 10 0.58	5.113	19 23 31.1	10.83	19 33.6
Feb. 4	3 50 45.75	0.596	18 25 6.3	1.95	6 50.3	Aug. 3	4 10 20.08	4.637	19 24 11.6	9.43	19 18.2
8	3 50 44.52	−0.023	18 25 17.7	3.74	6 34.5	7	4 10 37.66	4.149	19 24 46.5	8.03	19 2.8
12	3 50 45.57	+0.548	+18 25 36.2	+ 5.53	6 18.8	11	4 10 53.25	+3.645	+19 25 15.8	+ 6.62	18 47.3
16	3 50 48.90	1.117	18 26 1.9	7.29	6 3.2	15	4 11 6.80	3.127	19 25 39.4	5.17	18 31.8
20	3 50 54.50	1.682	18 26 34.5	9.02	5 47.5	19	4 11 18.25	2.597	19 25 57.1	3.70	18 16.2
24	3 51 2.35	2.243	18 27 14.0	10.72	5 31.9	23	4 11 27.56	2.055	19 26 9.0	2.25	18 0.6
28	3 51 12.44	2.801	18 28 0.2	12.37	5 16.4	27	4 11 34.68	1.505	19 26 15.1	+ 0.79	17 45.0
Mar. 4	3 51 24.74	+3.345	+18 28 52.9	+13.96	5 0.9	31	4 11 39.59	+0.948	+19 26 15.3	− 0.71	17 29.4
8	3 51 39.18	3.874	18 29 51.8	15.49	4 45.4	Sept. 4	4 11 42.26	+0.391	19 26 9.5	2.16	17 13.7
12	3 51 55.71	4.386	18 30 56.7	16.94	4 29.9	8	4 11 42.71	−0.164	19 25 58.1	3.55	16 58.0
16	3 52 14.24	4.878	18 32 7.2	18.30	4 14.5	12	4 11 40.95	0.716	19 25 41.1	4.95	16 42.2
20	3 52 34.71	5.350	18 33 23.0	19.59	3 59.1	16	4 11 36.99	1.263	19 25 18.5	6.33	16 26.4
24	3 52 57.02	+5.806	+18 34 43.8	+20.79	3 43.8	20	4 11 30.85	−1.805	+19 24 50.5	− 7.67	16 10.6
28	3 53 21.13	6.241	18 36 9.2	21.90	3 28.4	24	4 11 22.56	2.339	19 24 17.2	9.00	15 54.7
Apr. 1	3 53 46.91	6.649	18 37 38.9	22.93	3 13.1	28	4 11 12.16	2.857	19 23 38.6	10.26	15 38.8
5	3 54 14.27	7.031	18 39 12.5	23.86	2 57.9	Oct. 2	4 10 59.73	3.356	19 22 55.2	11.43	15 22.9
9	3 54 43.12	7.385	18 40 49.6	24.67	2 42.6	6	4 10 45.34	3.831	19 22 7.2	12.57	15 6.9
13	3 55 13.31	+7.708	+18 42 29.7	+25.35	2 27.4	10	4 10 29.11	−4.284	+19 21 14.7	−13.64	14 50.9
17	3 55 44.75	8.007	18 44 12.3	25.95	2 12.2	14	4 10 11.10	4.716	19 20 18.1	14.64	14 34.9
21	3 56 17.33	8.275	18 45 57.2	26.47	1 57.0	18	4 9 51.42	5.119	19 19 17.7	15.55	14 18.8
25	3 56 50.92	8.515	18 47 43.9	26.88	1 41.8	22	4 9 30.19	5.490	19 18 13.8	16.39	14 2.7
29	3 57 25.42	8.728	18 49 32.1	27.20	1 26.7	26	4 9 7.54	5.829	19 17 6.7	17.13	13 46.6
May 3	3 58 0.70	+8.905	+18 51 21.3	+27.38	1 11.5	30	4 8 43.61	−6.128	+19 15 56.9	−17.75	13 30.5
7	3 58 36.62	9.050	18 53 11.0	27.47	0 56.4	Nov. 3	4 8 18.57	6.387	19 14 44.8	18.28	13 14.3
11	3 59 13.06	9.164	18 55 0.9	27.45	0 41.3	7	4 7 52.57	6.605	19 13 30.8	18.69	12 58.2
15	3 59 49.89	9.245	18 56 50.5	27.36	0 26.1	11	4 7 25.78	6.786	19 12 15.4	18.99	12 42.0
19	4 0 26.98	9.298	18 58 39.6	27.17	0 11.0	15	4 6 58.34	6.924	19 10 59.0	19.18	12 25.8
23	4 1 4.23	+9.319	+19 0 27.7	+26.89	23 52.1	19	4 6 30.45	−7.015	+19 9 42.1	−19.25	12 9.6
27	4 1 41.49	9.308	19 2 14.6	26.52	23 37.0	23	4 6 2.28	7.062	19 8 25.2	19.17	11 53.4
31	4 2 18.65	9.266	19 3 59.7	26.04	23 21.9	27	4 5 34.02	7.060	19 7 8.9	18.97	11 37.2
June 4	4 2 55.57	9.188	19 5 42.8	25.47	23 6.8	Dec. 1	4 5 5.86	7.011	19 5 53.6	18.66	11 21.0
8	4 3 32.11	9.078	19 7 23.4	24.84	22 51.7	5	4 4 37.99	6.916	19 4 39.8	18.19	11 4.8
12	4 4 8.16	+8.941	+19 9 1.4	+24.14	22 36.5	9	4 4 10.59	−6.777	+19 3 28.2	−17.62	10 48.7
16	4 4 43.60	8.775	19 10 36.4	23.35	22 21.4	13	4 3 43.83	6.597	19 2 19.0	16.95	10 32.5
20	4 5 18.32	8.579	19 12 8.1	22.50	22 6.3	17	4 3 17.87	6.375	19 1 12.8	16.13	10 16.4
24	4 5 52.19	8.352	19 13 36.3	21.57	21 51.1	21	4 2 52.89	6.107	19 0 10.1	15.19	10 0.2
28	4 6 25.10	8.096	19 15 0.6	20.58	21 35.9	25	4 2 29.07	5.798	18 59 11.4	14.14	9 44.1
July 2	4 6 56.92	+7.811	+19 16 20.9	+19.55	21 20.7	29	4 2 6.56	−5.451	+18 58 17.1	−12.99	9 28.0
6	4 7 27.55	+7.498	+19 17 36.9	+18.43	21 5.5	33	4 1 45.51	−5.067	+18 57 27.6	−11.74	9 11.9

Greatest horizontal parallax,	November 24, 0″.31.	Greatest semidiameter,	November 24, 1″.33.
Least horizontal parallax,	May 23, 0″.29.	Least semidiameter,	May 23, 1″.25.

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Jan. 1	288 23 0.7	3 0 0.6	+10 48.2	−6 9 14.1	−10 28.4	9.6514296	0.1545181	0.1530425
3	294 28 40.6	3 5 50.0	9 5.2	6 28 23.2	8 38.2	9.6447860	0.1513664	0.1494831
5	300 47 4.3	3 12 45.2	6 53.1	6 43 36.0	6 31.5	9.6370674	0.1473850	0.1450633
7	307 20 28.9	3 20 51.8	4 14.8	6 54 16.2	4 5.3	9.6282785	0.1425086	0.1397102
9	314 11 22.7	3 30 15.4	+ 1 15.6	6 59 40.7	− 1 15.2	9.6184370	0.1366568	0.1333356
11	321 22 25.5	3 41 1.5	− 1 56.8	−6 58 58.7	+ 2 2.1	9.6075799	0.1297328	0.1258334
13	328 56 26.8	3 53 14.7	5 11.3	6 51 11.8	5 50.0	9.5957736	0.1216208	0.1170779
15	336 56 24.2	4 6 57.8	8 13.5	6 35 15.1	10 12.3	9.5831259	0.1121856	0.1069239
17	345 25 17.1	4 22 9.6	10 45.0	6 9 59.8	15 8.7	9.5698026	0.1012717	0.0952069
19	354 25 56.8	4 38 42.6	12 24.7	5 34 19.4	20 36.4	9.5560448	0.0887065	0.0817474
21	4 0 51.0	4 56 20.4	−12 50.6	−4 47 19.1	+26 26.3	9.5421891	0.0743061	0.0663604
23	14 11 41.7	5 14 32.8	11 44.6	3 48 31.7	32 19.6	9.5286819	0.0578895	0.0488752
25	24 58 55.2	5 32 34.2	8 58.5	2 38 17.3	37 47.6	9.5160843	0.0393025	0.0291625
27	36 21 9.0	5 49 20.9	− 4 41.8	−1 18 6.1	42 9.1	9.5050493	0.0184529	0.0071814
29	48 14 36.7	6 3 34.4	+ 0 33.3	+0 9 4.3	44 39.0	9.4962722	9.9953664	9.9830400
31	60 32 48.3	6 13 49.9	+ 5 52.6	+1 38 47.9	+44 36.6	9.4903978	9.9702502	9.9570631
Feb. 2	73 6 32.9	6 18 57.1	10 11.7	3 5 34.6	41 40.1	9.4879079	9.9435643	9.9298603
4	85 44 39.4	6 18 8.4	12 34.4	4 23 41.7	36 1.3	9.4890204	9.9160787	9.9023677
6	98 15 8.2	6 11 23.1	12 33.3	5 28 17.1	28 18.2	9.4936366	9.8888941	9.8758388
8	110 26 43.2	5 59 25.6	10 16.7	6 16 11.5	19 30.7	9.5013664	9.8633940	9.8517532
10	122 10 13.7	5 43 33.0	+ 6 20.2	+6 46 17.7	+10 39.6	9.5116140	9.8411058	9.8316267
12	133 19 18.7	5 25 15.6	+ 1 38.9	6 59 19.2	+ 2 32.1	9.5236912	9.8234683	9.8167485
14	143 50 37.2	5 5 59.3	− 3 1.8	6 57 13.8	− 4 24.3	9.5369203	9.8115480	9.8079053
16	153 43 22.9	4 46 52.8	7 4.0	6 42 36.3	9 59.4	9.5507006	9.8058130	9.8052256
18	162 58 47.2	4 28 43.8	10 6.8	6 18 8.1	14 16.7	9.5645411	9.8060597	9.8082053
20	171 39 15.5	4 12 0.5	−12 1.3	+5 46 15.2	−17 25.3	9.5780647	9.8115321	9.8158990
22	179 47 56.0	3 56 57.1	12 49.7	5 9 4.9	19 36.6	9.5909956	9.8211604	9.8271742
24	187 28 12.8	3 43 36.8	12 38.8	4 28 18.5	21 3.2	9.6031412	9.8338058	9.8409307
26	194 43 30.8	3 31 57.6	11 38.6	3 45 15.3	21 55.0	9.6143735	9.8484377	9.8562286
28	201 37 6.6	3 21 53.4	9 59.9	3 0 56.1	22 20.5	9.6246118	9.8642179	9.8723334
Mar. 2	208 12 3.0	3 13 17.0	− 7 52.9	+2 16 6.4	−22 26.3	9.6338090	9.8805138	9.8887081
4	214 31 8.5	3 6 1.2	5 27.3	1 31 20.4	22 17.6	9.6419409	9.8968749	9.9049807
6	220 36 56.7	2 59 58.7	2 51.6	0 47 3.3	21 58.0	9.6489986	9.9129988	9.9209082
8	226 31 48.0	2 55 3.3	− 0 13.0	+0 3 33.9	21 30.2	9.6549823	9.9286929	9.9363401
10	232 17 50.9	2 51 9.5	+ 2 22.2	−0 38 53.1	20 55.9	9.6598977	9.9438409	9.9511895
12	237 57 4.3	2 48 13.0	+ 4 48.7	−1 20 6.4	−20 16.4	9.6637517	9.9583817	9.9654153
14	243 31 19.0	2 46 10.4	7 2.1	1 59 56.6	19 32.6	9.6665528	9.9722894	9.9790043
16	249 2 20.3	2 44 59.2	8 58.3	2 38 15.0	18 44.9	9.6683071	9.9855611	9.9919617
18	254 31 48.7	2 44 37.6	10 34.2	3 14 53.2	17 52.6	9.6690196	9.9982081	0.0043029
20	260 1 22.9	2 45 4.9	11 46.7	3 49 42.3	16 55.7	9.6686917	0.0102490	0.0160492
22	265 32 40.8	2 46 21.2	+12 33.3	−4 22 32.5	−15 53.6	9.6673223	0.0217062	0.0272229
24	271 7 21.0	2 48 27.3	12 51.9	4 53 12.3	14 45.0	9.6649085	0.0326021	0.0378460
26	276 47 4.6	2 51 24.9	12 41.0	5 21 27.6	13 28.8	9.6614442	0.0429569	0.0479370
28	282 33 36.7	2 55 16.6	11 59.6	5 47 1.5	12 3.4	9.6569222	0.0527880	0.0575111
30	288 28 49.2	3 0 5.6	10 46.9	6 9 33.8	10 26.8	9.6513338	0.0621073	0.0665771
32	294 34 40.2	3 5 55.9	+ 9 3.4	−6 28 30.4	− 8 36.4	9.6446734	0.0709203	0.0751364
34	300 53 16.9	3 12 52.3	+ 6 50.8	−6 43 48.2	− 6 29.4	9.6369381	0.0792243	

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Apr. 1	294 34 40.2	3 5 55.9	+ 9 3.4	−6 28 39.4	− 8 36.4	9.6446734	0.0709203	0.0751364
3	300 53 16.9	3 12 52.3	6 50.8	6 43 48.2	6 29.4	9.6369381	0.0792243	0.0831822
5	307 26 56.9	3 21 0.0	4 12.2	6 54 23.8	4 2.6	9.6281327	0.0870076	0.0906973
7	314 18 8.4	3 30 24.8	+ 1 12.7	6 59 43.0	− 1 12.3	9.6182752	0.0942471	0.0976520
9	321 29 31.3	3 41 12.3	− 1 59.8	6 58 54.8	+ 2 5.4	9.6074030	0.1009059	0.1040017
11	329 3 55.7	3 53 26.9	− 5 14.3	−6 51 0.7	+ 5 54.1	9.5955829	0.1069312	0.1096851
13	337 4 18.9	4 7 11.1	8 16.1	6 34 55.8	10 16.6	9.5829236	0.1122526	0.1146213
15	345 33 40.4	4 22 24.4	10 47.1	6 9 31.3	15 13.6	9.5695921	0.1167782	0.1187077
17	354 34 51.1	4 38 58.8	12 25.6	5 33 40.6	20 41.8	9.5558306	0.1203935	0.1218176
19	4 10 18.5	4 56 37.2	12 50.3	4 46 29.4	26 31.8	9.5419771	0.1229603	0.1238013
21	14 21 43.0	5 14 49.9	−11 42.6	−3 47 30.9	+32 25.2	9.5284802	0.1243187	0.1244896
23	25 9 30.4	5 32 50.7	8 55.0	2 37 6.2	37 52.1	9.5159019	0.1242910	0.1236999
25	36 32 15.4	5 49 35.5	− 4 37.2	−1 16 46.9	42 12.4	9.5048968	0.1226938	0.1212513
27	48 26 9.5	6 3 45.9	+ 0 38.4	+0 10 28.1	44 40.2	9.4961603	0.1193530	0.1169826
29	60 44 40.0	6 13 58.2	5 57.3	1 40 11.5	44 35.2	9.4903352	0.1141268	0.1107765
May 1	73 18 34.0	6 18 59.0	+10 14.0	+3 6 52.7	+41 36.8	9.4879005	0.1069267	0.1025782
3	85 56 38.5	6 18 4.5	12 35.4	4 24 49.1	35 54.8	9.4890685	0.0977355	0.0924087
5	98 26 54.1	6 11 14.1	12 32.2	5 29 10.0	28 10.2	9.4937364	0.0866122	0.0803644
7	110 38 6.6	5 59 12.1	10 13.6	6 16 47.7	19 22.3	9.5015098	0.0736868	0.0666032
9	122 21 6.4	5 43 16.6	6 17.5	6 46 37.5	10 31.6	9.5117908	0.0591390	0.0513214
11	133 29 37.5	5 24 58.0	+ 1 34.3	+6 59 23.7	+ 2 25.0	9.5238904	0.0431774	0.0347343
13	144 0 19.6	5 5 41.1	− 3 5.9	6 57 5.4	− 4 30.1	9.5371319	0.0260183	0.0170553
15	153 52 29.7	4 46 35.4	7 7.3	6 42 17.5	10 4.3	9.5509161	0.0078704	9.9984874
17	163 7 20.2	4 28 27.4	10 9.1	6 17 40.8	14 20.2	9.5647541	9.9889293	9.9792180
19	171 47 17.2	4 11 45.6	12 2.5	5 45 42.5	17 27.6	9.5782701	9.9693745	9.9594196
21	179 55 29.6	3 56 43.8	−12 50.0	+5 8 28.2	−19 38.3	9.5911896	9.9493735	9.9392557
23	187 35 21.4	3 43 25.2	12 38.2	4 27 39.0	21 4.3	9.6033217	9.9290862	9.9188851
25	194 50 17.7	3 31 47.5	11 37.4	3 44 34.2	21 55.6	9.6145388	9.9086735	9.8984731
27	201 43 34.6	3 21 44.7	9 58.1	3 0 14.2	22 20.7	9.6247609	9.8883064	9.8781976
29	208 18 14.9	3 13 9.6	7 50.7	2 15 24.4	22 26.3	9.6339413	9.8681723	9.6582582
31	214 37 6.8	3 5 55.1	− 5 24.9	+1 30 38.7	−22 17.4	9.6420564	9.8484851	9.8388854
June 2	220 42 44.0	2 59 53.7	2 49.1	0 46 22.1	21 57.6	9.6490973	9.8294941	9.8203489
4	226 37 26.1	2 54 59.2	− 0 10.5	+0 2 53.7	21 29.6	9.6550642	9.8114897	9.8029593
6	232 23 21.9	2 51 6.4	+ 2 24.6	−0 39 32.3	20 55.4	9.6599628	9.7948035	9.7870700
8	238 2 29.9	2 48 10.9	4 50.9	1 20 44.4	20 16.0	9.6638003	9.7798083	9.7730688
10	243 36 41.3	2 46 9.1	+ 7 4.0	−2 0 33.3	−19 32.1	9.6665850	9.7669031	9.7613626
12	249 7 40.5	2 44 58.5	9 0.0	2 38 50.2	18 44.1	9.6683232	9.7564968	9.7523527
14	254 37 8.4	2 44 37.6	10 35.5	3 15 26.8	17 51.8	9.6690194	9.7489737	9.7463977
16	260 6 43.6	2 45 5.7	11 47.6	3 50 14.2	16 54.8	9.6686753	9.7446569	9.7437767
18	265 38 4.0	2 46 23.0	12 33.8	4 23 2.5	15 52.5	9.6672901	9.7437738	9.7446567
20	271 12 48.5	2 48 29.8	+12 51.9	−4 53 40.1	−14 43.9	9.6648604	9.7464245	9.7490676
22	276 52 37.7	2 51 28.2	12 40 6	5 21 52.9	13 27.6	9.6613800	9.7525673	9.7568972
24	282 39 17.4	2 55 20.8	11 58.7	5 47 24.2	12 2.0	9.6568417	9.7620241	9.7679082
26	288 34 39.0	3 0 10.7	10 45.5	6 9 53.4	10 25.1	9.6512372	9.7745050	9.7817659
28	294 40 41.1	3 6 1.9	9 1.5	6 28 55.6	8 34.5	9.6445606	9.7896393	9.7980731
30	300 59 30.8	3 12 59.2	+ 6 48.5	−6 44 0.4	− 6 27.3	9.6368093	9.8070148	9.8164112
32	307 33 25.8	3 21 8.2	+ 4 9.5	−6 54 31.4	− 4 0.1	9.6279880	9.8262101	

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
July 2	307 33 25.8	3 21 8.2	+ 4 9.5	−6 54 31.4	− 4 0.1	9.6279880	9.8262101	9.8363611
4	314 24 55.0	3 30 34.2	+ 1 9.8	6 59 45.2	− 1 9.4	9.6181151	9.8468155	9.8575266
6	321 36 37.8	3 41 23.0	− 2 2.8	6 58 50.8	+ 2 8.7	9.6072283	9.8684501	9.8795440
8	329 11 24.8	3 53 38.9	5 17.2	6 50 49.6	5 57.9	9.5953951	9.8907678	9.9020825
10	337 12 13.2	4 7 24.7	8 18.7	6 34 36.5	10 21.0	9.5827249	9.9134515	9.9248396
12	345 42 2.7	4 22 39 0	−10 49.1	−6 9 2.7	+15 18.5	9.5693855	9.9362124	9.9475363
14	354 43 43.6	4 39 14.4	12 26.6	5 33 1.8	20 47.1	9.5556206	9.9587780	9.9699045
16	4 19 43.0	4 56 53.6	12 50.0	4 45 39.8	26 37.4	9.5417696	9.9808832	9.9916819
18	14 31 40.7	5 15 6.4	11 40.9	3 46 30.3	32 30.5	9.5282832	0.0022672	0.0126058
20	25 20 0.1	5 33 6.3	8 51.8	2 35 55.7	37 56.6	9.5157245	0.0226644	0.0324099
22	36 43 14.7	5 49 49.4	− 4 32.6	−1 15 28.6	+42 15.5	9.5047497	0.0418097	0.0508321
24	48 37 33.7	6 3 56.6	+ 0 43.3	+0 11 50.8	44 41.2	9.4960538	0.0594466	0.0676256
26	60 56 21.1	6 14 4.2	6 1.9	1 41 33.9	44 33.7	9.4902782	0.0753443	0.0825811
28	73 30 22.6	6 19 0.0	10 18.1	3 8 9.4	41 22.5	9.4878979	0.0893192	0.0955465
30	86 8 23.6	6 18 0.2	12 36.6	4 25 55.0	35 48.7	9.4891208	0.1012563	0.1064471
Aug. 1	98 38 25.5	6 11 4.7	+12 31.0	+5 30 1.6	+28 2.4	9.4938397	0.1111223	0.1152902
3	110 49 14.7	5 58 58.6	10 10.6	6 17 23.1	19 14.1	9.5016559	0.1189632	0.1221577
5	122 31 44.6	5 43 0.2	6 13.0	6 46 56.7	10 23.8	9.5119694	0.1248931	0.1271902
7	133 39 40.8	5 24 40.0	+ 1 30.0	6 59 28.1	+ 2 18.1	9.5240909	0.1290713	0.1305595
9	144 9 47.0	5 5 23.3	− 3 9.9	6 56 57.2	− 4 35.8	9.5373443	0.1316780	0.1324495
11	154 1 22.0	4 46 18.2	− 7 10.6	+6 41 59.1	−10 8.7	9.5511317	0.1328958	0.1330382
13	163 15 38.9	4 28 11.5	10 11.3	6 17 14.6	14 23.5	9.5649664	0.1328965	0.1324888
15	171 55 6.0	4 11 31.4	12 3.8	5 45 10.7	17 29.9	9.5784742	0.1318323	0.1309422
17	180 2 51.1	3 56 31.0	12 50.2	5 7 52.4	19 40.0	9.5913820	0.1298323	0.1285151
19	187 42 19.0	3 43 14.0	12 37.6	4 27 0.6	21 5.3	9.6034999	0.1270020	0.1253033
21	194 56 54.5	3 31 37.8	−11 36.1	+3 43 54.2	−21 56.2	9.6147017	0.1234274	0.1213816
23	201 49 53.6	3 21 36.5	9 56.3	2 59 33.4	22 20.9	9.6249075	0.1191726	0.1168059
25	208 24 18.7	3 13 2.6	7 48.6	2 14 43.4	22 26.3	9.6340713	0.1142861	0.1116168
27	214 42 57.8	3 5 49.2	5 22.6	1 29 57.8	22 17.2	9.6421695	0.1088011	0.1058413
29	220 48 24.4	2 59 48.9	2 46.8	0 45 41.9	21 57.3	9.6491935	0.1027388	0.0994945
31	226 42 57.9	2 54 55.3	− 0 8.2	+0 2 14.2	−21 29 2	9.6551437	0.0961088	0.0925813
Sept. 2	232 28 46.8	2 51 3.4	+ 2 26.9	−0 40 10.8	20 54.8	9.6600258	0.0889113	0.0850975
4	238 7 49.8	2 48 8.8	4 53.1	1 21 21.8	20 15.4	9.6638479	0.0811381	0.0770310
6	243 41 57.7	2 46 7.8	7 5.9	2 1 9.3	19 31.4	9.6666166	0.0727736	0.0683627
8	249 12 54.9	2 44 57.9	9 1.6	2 39 24.7	18 43.3	9.6683387	0.0637952	0.0590672
10	254 42 22.4	2 44 37.8	+10 36.8	−3 15 59.7	−17 51.0	9.6690189	0.0541744	0.0491125
12	260 11 58.9	2 45 6.8	11 48.5	3 50 45.4	16 54.0	9.6686592	0.0438771	0.0384630
14	265 43 22.1	2 46 24.6	12 34.2	4 23 31.9	15 51.5	9.6672582	0.0328653	0.0270785
16	271 18 10.4	2 48 32.2	12 52.0	4 54 7.3	14 42.8	9.6648128	0.0210979	0.0149178
18	276 58 5.5	2 51 31.5	12 40.1	5 22 17.8	13 26.4	9.6613167	0.0085332	0.0019396
20	282 44 52.4	2 55 24.8	+11 57.7	−5 47 46.5	−12 0.6	9.6567623	9.9951328	9.9881092
22	288 40 22.8	3 0 15.6	10 44.3	6 10 12.5	10 23.6	9.6511418	9.9808663	9.9734035
24	294 46 35.6	3 6 7.8	8 59.9	6 29 11.5	8 32.7	9.6444490	9.9657215	9.9578230
26	301 5 38.2	3 13 6.3	6 46.2	6 44 12.3	6 25.2	9.6366813	9.9497142	9.9414045
28	307 39 48.4	3 21 16.3	4 6.8	6 54 38.8	3 57.7	9.6278442	9.9329064	9.9242461
30	314 31 34.8	3 30 43.4	+ 1 6.8	−6 59 47.3	− 1 6.6	9.6179555	9.9154446	9.9065389
32	321 43 37.4	3 41 33.4	− 2 5.8	−6 58 46.8	+ 2 12.0	9.6070540	9.8975746	

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Oct. 2	321 43 37.4	3 41 33.4	− 2 5.8	−6 58 46.8	+ 2 12.0	9.6070540	9.8975746	9.8886096
4	329 18 46.8	3 53 50.7	5 20.2	6 50 38.5	6 1.7	9.5952070	9.8797152	9.8709781
6	337 20 0.4	4 7 38.0	8 21.3	6 34 17.3	10 25.2	9.5825253	9.8625030	9.8544122
8	345 50 17.9	4 22 53.6	10 51.2	6 8 34.4	15 23.2	9.5691774	9.8468475	9.8399680
10	354 52 28.9	4 39 30.0	12 27.6	5 32 23.4	20 52.4	9.5554083	9.8339477	9.8289696
12	4 29 0.6	4 57 10.1	−12 49.7	−4 44 50.6	+26 42.8	9.5415595	9.8252183	9.8228692
14	14 41 31.4	5 15 22.9	11 39.1	3 45 30.4	32 35.8	9.5280826	9.8220757	9.8229574
16	25 30 23.5	5 33 22.2	8 48.4	2 34 45.8	38 1.2	9.5155432	9.8255865	9.8299799
18	36 54 8.6	5 50 3.6	− 4 28.1	−1 14 10.8	42 18.7	9.5045983	9.8360948	9.8438294
20	48 48 53.1	6 4 7.7	+ 0 48.4	+0 13 13.0	44 42.4	9.4959426	9.8530304	9.8635040
22	61 7 58.9	6 14 11.4	+ 6 6.5	+1 42 55.8	+44 32.2	9.4902160	9.8750295	9.8873739
24	73 42 9.3	6 19 1.9	10 21.2	3 9 25.6	41 28.4	9.4878902	9.9003056	9.9136044
26	86 20 8.5	6 17 56.3	12 37.6	4 27 0.8	35 42.1	9.4891687	9.9270704	9.9405283
28	98 49 57.1	6 10 55.5	12 29.8	5 30 53.0	27 54.6	9.4939389	9.9538305	9.9668564
30	111 0 23.9	5 58 45.6	10 7.6	6 17 58.3	19 5.8	9.5017981	9.9795121	9.9917266
Nov. 1	122 42 24.9	5 42 44.3	+ 6 8.7	+6 47 15.7	+10 15.9	9.5121444	0.0034501	0.0146507
3	133 49 47.4	5 24 22.6	+ 1 25.5	6 59 32.3	+ 2 11.2	9.5242881	0.0253105	0.0354230
5	144 19 18.5	5 5 5.6	− 3 14.0	6 56 48.6	− 4 41.6	9.5375538	0.0449914	0.0540248
7	154 10 18.3	4 46 1.1	7 13.9	6 41 40.4	10 13.2	9.5513451	0.0625378	0.0705486
9	163 24 2.6	4 27 55.6	10 13.6	6 16 48.1	14 26.8	9.5651773	0.0780764	0.0851424
11	172 2 58.7	4 11 16.7	−12 5.0	+5 44 38.5	−17 32.4	9.5786775	0.0917685	0.0979760
13	180 10 16.4	3 56 18.1	12 50.4	5 7 16.2	19 41.6	9.5915746	0.1037862	0.1092194
15	187 49 20.2	3 43 2.8	12 37.0	4 26 21.8	21 6.3	9.6036793	0.1142947	0.1190305
17	195 3 34.6	3 31 28.0	11 34.9	3 43 13.8	21 56.7	9.6148661	0.1234441	0.1275517
19	201 56 15.3	3 21 28.0	9 54.5	2 58 52.2	22 21.2	9.6250562	0.1313684	0.1349079
21	208 30 24.9	3 12 55.5	− 7 46.4	+2 14 2.0	−22 26.3	9.6342039	0.1381830	0.1412056
23	214 48 50.9	3 5 43.2	5 20.2	1 29 16.7	22 17.0	9.6422857	0.1439864	0.1465352
25	220 54 6.6	2 59 43.9	2 44.2	0 45 1.3	21 56.9	9.6492934	0.1488612	0.1509726
27	226 48 31.3	2 54 51.3	− 0 5.8	+0 1 34.5	21 28.7	9.6552274	0.1528769	0.1545800
29	232 34 13.0	2 51 0.3	+ 2 29.2	−0 40 49.4	20 54.3	9.6600934	0.1560882	0.1574070
Dec. 1	238 13 10.7	2 48 6.4	+ 4 55.2	−1 21 59.2	−20 14.7	9.6636988	0.1585407	0.1594932
3	243 47 14.6	2 46 6.1	7 7.9	2 1 45.3	19 30.7	9.6666516	0.1602679	0.1608676
5	249 18 9.6	2 44 57.2	9 3.3	2 39 59.3	18 42.4	9.6683582	0.1612946	0.1615500
7	254 47 36.7	2 44 37.9	10 38.1	3 16 32.7	17 50.1	9.6690229	0.1616353	0.1615507
9	260 17 14.0	2 45 7.5	11 49.4	3 51 16.6	16 53.0	9.6686476	0.1612963	0.1608718
11	265 48 39.5	2 46 26.1	+12 34.7	−4 24 1.1	−15 50.5	9.6672307	0.1602757	0.1595067
13	271 23 31.8	2 48 34.6	12 52.0	4 54 34.4	14 41.6	9.6647693	0.1585621	0.1574392
15	277 3 32.2	2 51 34.6	12 39.7	5 22 42.6	13 25.2	9.6612570	0.1561346	0.1546445
17	282 50 26.4	2 55 28.7	11 56.8	5 48 8.7	11 59.2	9.6566863	0.1529641	0.1510880
19	288 46 5.6	3 0 20.4	10 42.8	6 10 31.9	10 22.0	9.6510493	0.1490105	0.1467246
21	294 52 29.2	3 6 13.6	+ 8 57.8	−6 29 27.2	− 8 30.8	9.6443398	0.1442227	0.1414967
23	301 11 44.5	3 13 13.1	6 43.9	6 44 24.1	6 23.1	9.6365553	0.1385373	0.1353345
25	307 46 9.4	3 21 24.3	4 4.2	6 54 46.1	3 55.2	9.6277012	0.1318775	0.1281543
27	314 38 13.1	3 30 52.8	+ 1 3.9	6 59 49.3	− 1 3.7	9.6177964	0.1241514	0.1198549
29	321 50 35.6	3 41 43.9	− 2 8.9	6 58 42.7	+ 2 15.2	9.6068790	0.1152498	0.1103194
31	329 26 7.2	3 54 2.6	− 5 23.1	−6 50 27.4	+ 6 5.5	9.5950178	0.1050465	0.0994123
33	337 27 46.3	4 7 51.4	− 8 23.9	−6 33 58.1	+10 22.6	9.5823237	0.0933973	

VENUS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Jan. 3	30 56 34.0	1 35 55.7	−3 0.9	−2 23 24.3	+4 2.0	9.8597828	0.0130548	0.0073423
7	37 20 30.0	1 36 2.2	2 56.2	2 6 24.1	4 27.6	9.8594543	0.0015124	9.9955622
11	43 44 52.1	1 36 8.9	2 42.6	1 47 47.7	4 50.0	9.8591238	9.9894891	9.9832905
15	50 9 41.1	1 36 15.7	2 20.8	1 27 48.8	5 8.8	9.8587955	9.9769633	9.9705050
19	56 34 57.8	1 36 22.7	1 52.0	1 6 42.0	5 23.9	9.8584734	9.9639127	9.9571831
23	63 0 42.6	1 36 29.8	−1 17.5	−0 44 43.1	+5 34.9	9.8581618	9.9503122	9.9432953
27	69 26 56.1	1 36 37.0	−0 39.1	−0 22 8.5	5 41.7	9.8578645	9.9361274	9.9288025
31	75 53 38.5	1 36 44.2	+0 1.3	+0 0 44.7	5 44.2	9.8575853	9.9213151	9.9136589
Feb. 4	82 20 49.6	1 36 51.3	0 41.7	0 23 38.9	5 42.2	9.8573279	9.9058287	9.8978186
8	88 48 29.1	1 36 58.3	1 20.1	0 46 16.8	5 35.9	9.8570955	9.8896232	9.8812379
12	95 16 36.1	1 37 5.1	+1 54.4	+1 8 20.6	+5 25.3	9.8568913	9.8726586	9.8638806
16	101 45 9.2	1 37 11.4	2 22.9	1 29 33.4	5 10.4	9.8567179	9.8548990	9.8457101
20	108 14 6.4	1 37 17.1	2 44.2	1 49 38.4	4 51.4	9.8565777	9.8363086	9.8266888
24	114 43 25.2	1 37 22.1	2 57.1	2 8 19.9	4 28.7	9.8564724	9.8168446	9.8067694
28	121 13 2.5	1 37 26.3	3 1.0	2 25 23.2	4 2.4	9.8564034	9.7964567	9.7858996
Mar. 4	127 42 54.5	1 37 29.5	+2 55.5	+2 40 34.9	+3 32.9	9.8563717	9.7750920	9.7640983
8	134 12 56.8	1 37 31.5	2 41.1	2 53 43.0	3 0.7	9.8563777	9.7527085	9.7411267
12	140 43 4.7	1 37 32.3	2 18.4	3 4 37.2	2 26.1	9.8564213	9.7292842	9.7171845
16	147 13 13.1	1 37 31.7	1 48.6	3 13 8.9	1 49.6	9.8565019	9.7048329	9.6922359
20	153 43 16.3	1 37 29.7	1 13.3	3 19 11.7	1 11.7	9.8566185	9.6794051	9.6663541
24	160 13 8.9	1 37 26.3	+0 34.3	+3 22 41.1	+0 32.9	9.8567696	9.6530998	9.6396648
28	166 42 45.2	1 37 21.6	−0 6.5	3 23 34.6	−0 6.2	9.8569531	9.6260776	9.6123740
Apr. 1	173 11 59.9	1 37 15.5	0 46.9	3 21 51.9	0 45.1	9.8571664	9.5985992	9.5848095
5	179 40 47.7	1 37 8.2	1 24.9	3 17 34.8	1 23.3	9.8574071	9.5710754	9.5574840
9	186 9 4.1	1 36 59.8	1 58.5	3 10 47.1	2 0.3	9.8576719	9.5441397	9.5311637
13	192 36 44.9	1 36 50.5	−2 26.0	+3 1 34.7	−2 35.6	9.8579575	9.5186955	9.5068922
17	199 3 46.9	1 36 40.4	2 46.2	2 50 5.2	3 8.8	9.8582601	9.4959235	9.4859706
21	205 30 7.4	1 36 29.8	2 58.0	2 36 28.0	3 30.4	9.8585759	9.4772144	9.4698290
25	211 55 44.9	1 36 18.9	3 0.8	2 20 54.1	4 7.1	9.8589009	9.4639770	9.4597967
29	218 20 38.4	1 36 7.9	2 54.6	2 3 35.7	4 31.6	9.8592312	9.4573932	9.4568325
May 3	224 44 48.1	1 35 57.0	−2 39.7	+1 44 46.3	−4 59.6	9.8595624	9.4581328	9.4612684
7	231 8 14.8	1 35 46.5	2 16.8	1 24 40.4	5 9.8	9 8598904	9.4661686	9.4727219
11	237 31 0.3	1 35 36.5	1 47.3	1 3 33.4	5 23.1	9.8602112	9.4807840	9.4901884
15	243 53 7.3	1 35 27.2	1 12.5	0 41 41.2	5 32.4	9.8605210	9.5007548	9.5123009
19	250 14 38.7	1 35 18.8	−0 34.2	+0 19 19.9	5 37.6	9.8608157	9.5246455	9.5376201
23	256 35 38.4	1 35 11.3	+0 5.7	−0 3 13.8	−5 38.6	9.8610920	9.5510714	9.5648630
27	262 56 10.4	1 35 4.9	0 45.3	0 25 43.6	5 35.5	9.8613462	9.5788772	9.5930142
31	269 16 19.1	1 34 59.6	1 22.7	0 47 53.0	5 28.4	9.8615756	9.6071919	9.6213434
June 4	275 36 9.2	1 34 55.6	1 56.0	1 9 26.0	5 17.4	9.8617772	9.6354146	9.6493620
8	281 55 45.4	1 34 52.7	2 23.6	1 30 7.1	5 2.6	9.8619487	9.6631498	9.6767497
12	288 15 12.2	1 34 50.9	+2 44.3	−1 49 41.6	−4 44.1	9.8620880	9.6901399	9.7033020
16	294 34 34.1	1 34 50.2	2 56.9	2 7 55.4	4 22.3	9.8621935	9.7162217	9.7288888
20	300 53 55.3	1 34 50.6	3 1.0	2 24 35.6	3 57.3	9.8622638	9.7412959	9.7534385
24	307 13 19.7	1 34 51.9	2 56.3	2 39 30.0	3 29.4	9.8622983	9.7653147	9.7769249
28	313 32 51.0	1 34 54.0	2 43.0	2 52 28.1	2 59.0	9.8622964	9.7882718	9.7993598
July 2	319 52 32.4	1 34 56.8	+2 21.8	−3 3 20.4	−2 26.6	9.8622581	9.8101941	9.8207811
6	326 12 26.5	1 35 0.3	+1 53.7	−3 11 59.0	−1 52.4	9.8621838	9.8311262	

VENUS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
July 2	319 52 32.4	1 34 56.8	+2 21.8	−3 3 20.4	−2 26.6	9.8622581	9.8101941	9.8207811
6	326 12 26.5	1 35 0.3	1 53.7	3 11 59.0	1 52.4	9.8621838	9.8311262	9.8412356
10	332 32 35.7	1 35 4.4	1 20.1	3 18 17.5	1 16.7	9.8620744	9.8511151	9.8607700
14	338 53 2.3	1 35 8.9	0 42.5	3 22 11.0	0 40.0	9.8619313	9.8702054	9.8794238
18	345 13 47.5	1 35 13.8	+0 2.9	3 23 36.5	−0 2.7	9.8617559	9.8884309	9.8972307
22	351 34 52.9	1 35 19.0	−0 36.9	−3 22 32.4	+0 34.7	9.8615506	9.9058274	9.9142255
26	357 56 19.7	1 35 24.4	1 15.0	3 18 59.3	1 11.8	9.8613177	9.9224305	9.9304478
30	4 18 8.6	1 35 30.1	1 49.4	3 12 59.1	1 48.1	9.8610599	9.9382831	9.9459423
Aug. 3	10 40 20.6	1 35 36.0	2 18.5	3 4 36.0	2 23.2	9.8607805	9.9534309	9.9607546
7	17 2 56.2	1 35 42.0	2 40.8	2 53 55.4	2 56.7	9.8604825	9.9679184	9.9749263
11	23 25 56.3	1 35 48.1	−2 55.2	−2 41 4.8	+3 28.2	9.8601699	9.9817823	9.9884899
15	29 49 21.3	1 35 54.4	3 0.9	2 26 13.1	3 57.2	9.8598464	9.9950516	0.0014700
19	36 13 12.1	1 36 1.0	2 57.6	2 9 31.1	4 23.3	9.8595160	0.0077482	0.0138883
23	42 37 29.4	1 36 7.7	2 45.6	1 51 10.7	4 46.3	9.8591828	0.0198933	0.0257664
27	49 2 13.6	1 36 14.5	2 25.2	1 31 25.2	5 5.8	9.8588510	0.0315109	0.0371304
31	55 27 25.7	1 36 21.5	−1 57.5	−1 10 29.2	+5 21.5	9.8585248	0.0426287	0.0480092
Sept. 4	61 53 6.2	1 36 28.7	1 23.9	0 48 38.2	5 33.2	9.8582082	0.0532755	0.0584306
8	68 19 15.6	1 36 36.0	0 46.1	0 26 8.6	5 40.8	9.8579054	0.0634770	0.0684167
12	74 45 54.1	1 36 43.3	−0 5.9	−0 3 17.3	5 44.1	9.8576202	0.0732517	0.0779837
16	81 13 1.7	1 36 50.5	+0 34.7	+0 19 38.2	5 42.9	9.8573562	0.0826136	0.0871430
20	87 40 38.0	1 36 57.6	+1 13.6	+0 42 20.2	+5 37.4	9.8571170	0.0915731	0.0959054
24	94 8 42.2	1 37 4.4	1 48.7	1 4 31.5	5 27.5	9.8569057	0.1001418	0.1042845
28	100 37 12.9	1 37 10.8	2 18.4	1 25 54.5	5 13.3	9.8567251	0.1083356	0.1122973
Oct. 2	107 6 8.3	1 37 16.7	2 41.1	1 46 12.7	4 55.1	9.8565773	0.1161725	0.1199636
6	113 35 26.0	1 37 21.9	2 55.5	2 5 10.2	4 33.0	9.8564647	0.1236719	0.1272993
10	120 5 2.9	1 37 26.3	+3 0.9	+2 22 31.8	+4 7.2	9.8563884	0.1308475	0.1343169
14	126 34 55.1	1 37 29.7	2 57.2	2 38 4.1	3 38.3	9.8563496	0.1377087	0.1410230
18	133 4 58.6	1 37 31.9	2 44.3	2 51 34.7	3 6.6	9.8563489	0.1442609	0.1474236
22	139 35 8.6	1 37 32.9	2 22.9	3 2 53.1	2 32.3	9.8563862	0.1505111	0.1535249
26	146 5 19.9	1 37 32.6	1 54.3	3 11 50.3	1 56.0	9.8564608	0.1564667	0.1593376
30	152 35 27.0	1 37 30.8	+1 19.8	+3 18 19.6	+1 18.3	9.8565720	0.1621399	0.1648748
Nov. 3	159 5 24.3	1 37 27.6	0 41.3	3 22 16.0	0 39.7	9.8567183	0.1675446	0.1701504
7	165 35 6.2	1 37 23.1	+0 0.7	3 23 36.8	+0 0.6	9.8568975	0.1726932	0.1751742
11	172 4 27.2	1 37 17.2	−0 40.0	3 22 21.2	−0 38.4	9.8571075	0.1775941	0.1799531
15	178 33 21.9	1 37 10.0	1 18.5	3 18 30.8	1 16.7	9.8573454	0.1822516	0.1844902
19	185 1 45.8	1 37 1.7	−1 53.0	+3 12 9.0	−1 54.0	9.8576082	0.1866687	0.1887880
23	191 29 34.6	1 36 52.5	2 21.8	3 3 21.3	2 29.6	9.8578924	0.1908489	0.1928527
27	197 56 44.7	1 36 42.5	2 43.3	2 52 15.1	3 3.2	9.8581943	0.1948004	0.1966933
Dec. 1	204 23 13.6	1 36 31.9	2 56.5	2 38 59.3	3 34.2	9.8585102	0.1985329	0.2003203
5	210 48 59.4	1 36 21.0	3 1.0	2 23 44.8	4 2.5	9.8588359	0.2020568	0.2037436
9	217 14 1.1	1 36 9.9	−2 56.3	+2 6 43.6	−4 27.6	9.8591673	0.2053810	0.2069694
13	223 38 18.7	1 35 58.9	2 42 9	1 48 9.1	4 49.2	9.8595004	0.2085094	0.2100004
17	230 1 53.0	1 35 48.3	2 21.4	1 28 15.4	5 7.0	9.8598309	0.2114428	0.2128368
21	236 24 45.6	1 35 38.1	1 52.9	1 7 18.0	5 21.0	9.8601546	0.2141825	0.2154807
25	242 46 58.9	1 35 28.6	1 18.9	0 45 32.5	5 31.0	9.8604679	0.2167319	0.2179368
29	249 8 36.0	1 35 20.0	−0 41.0	+0 23 15.0	−5 36.9	9.8607666	0.2190966	0.2202125
33	255 29 40.7	1 35 12.4	−0 1.3	+0 0 42.3	−5 38.7	9.8610471	0.2212851	

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GREENWICH MEAN NOON.

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							At Date.	At Intermediate Date.
	° ′ ″	′ ″	″	° ′ ″	″			
Jan. 3	353 28 40.9	37 42.56	−50.5	−1 31 11.7	+41.65	0.1425234	0.2912579	0.2934163
7	355 59 19.5	37 36.50	52.0	1 28 20.1	44.11	0.1431000	0.2955626	0.2976967
11	358 29 32.3	37 29.80	53.1	1 25 18.8	46.47	0.1437422	0.2998192	0.3019299
15	0 59 17.1	37 22.42	53.7	1 22 8.3	48.70	0.1444476	0.3040296	0.3061187
19	3 28 30.9	37 14.36	53.9	1 18 49.2	50.80	0.1452147	0.3081972	0.3102655
23	5 57 11.3	37 5.79	−53.7	−1 15 21.9	+52.76	0.1460416	0.3123234	0.3143699
27	8 25 16.5	36 56.68	53.2	1 11 47.1	54.59	0.1469260	0.3164048	0.3184273
31	10 52 44.0	36 47.02	52.2	1 8 5.2	56.29	0.1478658	0.3204366	0.3224323
Feb. 4	13 19 31.8	36 36.82	50.8	1 4 16.8	57.84	0.1488586	0.3244137	0.3263807
8	15 45 38.0	36 26.21	49.2	1 0 22.5	59.24	0.1499021	0.3283336	0.3302723
12	18 11 0.9	36 15.16	−47.2	−0 56 22.9	+60.50	0.1509938	0.3321970	0.3341078
16	20 35 38.8	36 3.69	44.8	0 52 18.5	61.62	0.1521308	0.3360047	0.3378883
20	22 59 30.2	35 51.89	42.2	0 48 9.9	62.60	0.1533109	0.3397581	0.3416135
24	25 22 33.8	35 39.78	39.2	0 43 57.7	63.44	0.1545313	0.3434538	0.3452783
28	27 44 48.1	35 27.34	36.0	0 39 42.4	64.15	0.1557893	0.3470863	0.3488773
Mar. 4	30 6 12.3	35 14.67	−32.6	−0 35 24.5	+64.72	0.1570823	0.3506503	0.3524049
8	32 26 45.3	35 1.77	29.0	0 31 4.6	65.16	0.1584075	0.3541414	0.3558595
12	34 46 26.2	34 48.63	25.2	0 26 43.2	65.46	0.1597621	0.3575586	0.3592403
16	37 5 14.2	34 35.34	21.2	0 22 20.9	65.65	0.1611435	0.3609037	0.3625489
20	39 23 8.8	34 21.92	17.2	0 17 58.0	65.72	0.1625488	0.3641759	0.3657845
24	41 40 9.4	34 8.42	−13.1	−0 13 35.1	+65.66	0.1639756	0.3673739	0.3689431
28	43 56 16.0	33 54.80	8.9	0 9 12.7	65.49	0.1654211	0.3704918	0.3720191
Apr. 1	46 11 27.7	33 41.11	4.7	0 4 51.2	65.21	0.1668827	0.3735241	0.3750068
5	48 25 44.9	33 27.45	− 0.5	−0 0 31.0	64.84	0.1683583	0.3764665	0.3779030
9	50 39 7.3	33 13.77	+ 3.7	+0 3 47.5	64.36	0.1698445	0.3793166	0.3807074
13	52 51 35.1	33 0.11	+ 7.8	+0 8 3.9	+63.79	0.1713394	0.3820754	0.3834209
17	55 3 8.2	32 46.51	11.8	0 12 17.8	63.12	0.1728405	0.3847435	0.3860430
21	57 13 47.2	32 32.94	15.8	0 16 28.9	62.37	0.1743453	0.3873193	0.3885712
25	59 23 31.7	32 19.41	19.7	0 20 36.8	61.55	0.1758518	0.3897984	0.3909999
29	61 32 22.7	32 6.03	23.4	0 24 41.3	60.65	0.1773579	0.3921751	0.3933236
May 3	63 40 20.4	31 52.80	+26.9	+0 28 42.0	+59.67	0.1788613	0.3944448	0.3955384
7	65 47 25.3	31 39.72	30.3	0 32 38.7	58.65	0.1803596	0.3966044	0.3976434
11	67 53 38.3	31 26.78	33.5	0 36 31.2	57.55	0.1818512	0.3986552	0.3996398
15	69 58 59.7	31 13.99	36.5	0 40 19.1	56.39	0.1833341	0.4005974	0.4015276
19	72 3 30.4	31 1.37	39.3	0 44 2.3	55.19	0.1848064	0.4024300	0.4033043
23	74 7 10.8	30 48.91	+41.8	+0 47 40.6	+53.93	0.1862663	0.4041498	0.4049655
27	76 10 1.9	30 36.69	44.1	0 51 13.7	52.64	0.1877120	0.4057511	0.4065057
31	78 12 4.6	30 24.72	46.3	0 54 41.6	51.29	0.1891422	0.4072288	0.4079203
June 4	80 13 19.9	30 12.98	48.0	0 58 4.0	49.90	0.1905547	0.4085798	0.4092077
8	82 13 48.7	30 1.44	49.6	1 1 20.8	48.49	0.1919486	0.4098043	0.4103693
12	84 13 31.7	29 50.11	+50.9	+1 4 31.9	+47.04	0.1933221	0.4109029	0.4114051
16	86 12 29.8	29 39.06	52.1	1 7 37.1	45.56	0.1946740	0.4118752	0.4123130
20	88 10 44.4	29 28.29	53.0	1 10 36.4	44.07	0.1960029	0.4127180	0.4130895
24	90 8 16.4	29 17.76	53.5	1 13 29.7	42.55	0.1973076	0.4134265	0.4137281
28	92 5 6.8	29 7.50	53.8	1 16 16.8	41.00	0.1985870	0.4139945	0.4142247
July 2	94 1 16.7	28 57.48	+53.9	+1 18 57.7	+39.44	0.1998396	0.4144189	0.4145769
6	95 56 47.0	28 47.77	+53.8	+1 21 32.3	+37.86	0.2010648	0.4146987	0.4147843

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	° ′ ″	′ ″	″	° ′ ″	″			
July 2	94 1 16.7	28 57.48	+53.9	+1 18 57.7	+39.44	0.1998396	0.4144189	0.4145769
6	95 56 47.0	28 47.77	53.8	1 21 32.3	37.86	0.2010648	0.4146987	0.4147843
10	97 51 39.2	28 38.35	53.4	1 24 0.6	36.29	0.2022612	0.4148342	0.4148480
14	99 45 54.1	28 29.20	52.8	1 26 22.6	34.69	0.2034281	0.4148255	0.4147663
18	101 39 33.1	28 20.35	51.8	1 28 38.1	33.06	0.2045646	0.4146697	0.4145353
22	103 32 37.2	28 11.75	+50.7	+1 30 47.1	+31.44	0.2056698	0.4143620	0.4141488
26	105 25 7.4	28 3.45	49.4	1 32 49.6	29.81	0.2067428	0.4138957	0.4136017
30	107 17 5.1	27 55.46	47.9	1 34 45.6	28.19	0.2077828	0.4132668	0.4128907
Aug. 3	109 8 31.4	27 47.80	46.3	1 36 35.1	26.56	0.2087890	0.4124734	0.4120151
7	110 59 27.8	27 40.41	44.4	1 38 18.1	24.92	0.2097609	0.4115156	0.4109751
11	112 49 55.0	27 33.31	+42.3	+1 39 54.5	+23.27	0.2106981	0.4103931	0.4097693
15	114 39 54.6	27 26.50	40.0	1 41 24.3	21.64	0.2115994	0.4091033	0.4083942
19	116 29 27.3	27 19.96	37.7	1 42 47.6	20.01	0.2124646	0.4076408	0.4068431
23	118 18 34.6	27 13.75	35.2	1 44 4.4	18.37	0.2132932	0.4059996	0.4051097
27	120 7 17.6	27 7.83	32.6	1 45 14.6	16.74	0.2140847	0.4041735	0.4031905
31	121 55 37.6	27 2.23	+29.9	+1 46 18.3	+15.11	0.2148386	0.4021603	0.4010830
Sept. 4	123 43 35.8	26 56.91	26.9	1 47 15.5	13.47	0.2155544	0.3999588	0.3987874
8	125 31 13.2	26 51.90	23.9	1 48 6.1	11.86	0.2162316	0.3975687	0.3963022
12	127 18 31.3	26 47.20	20.9	1 48 50.4	10.25	0.2168701	0.3949874	0.3936236
16	129 5 31.1	26 42.77	17.7	1 49 28.1	8.63	0.2174694	0.3922098	0.3907448
20	130 52 13.8	26 38.66	+14.5	+1 49 59.4	+ 7.03	0.2180292	0.3892282	0.3876590
24	132 38 40.7	26 34.86	11.3	1 50 24.3	5.44	0.2185495	0.3860367	0.3843606
28	134 24 53.0	26 31.35	8.0	1 50 42.9	3.85	0.2190296	0.3826305	0.3808468
Oct. 2	136 10 51.8	26 28.13	4.7	1 50 55.1	2.25	0.2194694	0.3790087	0.3771167
6	137 56 38.4	26 25.22	+ 1.4	1 51 0.9	+ 0.66	0.2198688	0.3751702	0.3731692
10	139 42 13.9	26 22.58	− 1.9	+1 51 0.4	− 0.89	0.2202274	0.3711126	0.3690000
14	141 27 39.4	26 20.26	5.2	1 50 53.8	2.45	0.2205454	0.3668304	0.3646021
18	143 12 56.3	26 18.25	8.5	1 50 40.8	4.01	0.2208223	0.3623149	0.3599675
22	144 58 5.7	26 16.52	11.7	1 50 21.7	5.55	0.2210582	0.3575591	0.3550890
26	146 43 8.8	26 15.11	14.8	1 49 56.4	7.09	0.2212526	0.3525573	0.3499636
30	148 28 6.9	26 14.00	−18.0	+1 49 25.0	− 8.61	0.2214059	0.3473077	0.3445899
Nov. 3	150 13 1.1	26 13.17	21.1	1 48 47.5	10.14	0.2215178	0.3418092	0.3389656
7	151 57 52.6	26 12.65	24.0	1 48 3.9	11.65	0.2215882	0.3360584	0.3330871
11	153 42 42.6	26 12.42	26.9	1 47 14.3	13.15	0.2216173	0.3300501	0.3269468
15	155 27 32.3	26 12.47	29.8	1 46 18.7	14.64	0.2216048	0.3237754	0.3205352
19	157 12 22.7	26 12.82	−32.4	+1 45 17.2	−16.11	0.2215508	0.3172252	0.3138446
23	158 57 15.2	26 13.51	35.0	1 44 9.8	17.57	0.2214553	0.3103929	0.3068700
27	160 42 11.1	26 14.47	37.5	1 42 56.6	19.04	0.2213185	0.3032754	0.2996094
Dec. 1	162 27 11.3	26 15.72	39.7	1 41 37.5	20.49	0.2211404	0.2958712	0.2920609
5	164 12 17.2	26 17.27	41.9	1 40 12.7	21.91	0.2209210	0.2881776	0.2842204
9	165 57 29.8	26 19.12	−43.9	+1 38 42.2	−23.34	0.2206604	0.2801882	0.2760799
13	167 42 50.5	26 21.28	45.8	1 37 6.0	24.75	0.2203588	0.2718936	0.2676288
17	169 28 20.4	26 23.71	47.4	1 35 24.2	26.15	0.2200162	0.2632836	0.2588577
21	171 14 0.5	26 26.46	48.8	1 33 36.8	27.55	0.2196328	0.2543497	0.2497600
25	172 59 52.4	26 29.51	50.2	1 31 43.8	28.91	0.2192089	0.2450878	0.2403333
29	174 45 57.0	26 32.87	−51.2	+1 29 45.5	−30.26	0.2187448	0.2354963	0.2305761
33	176 32 15.8	26 36.55	−52.2	+1 27 41.7	−31.63	0.2182404	0.2255722	

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	° ′ ″	′ ″	″	° ′ ″	″			
Jan. 3	259 24 27.0	4 48.84	−17.4	+0 26 40.8	−6.20	0.7236060	0.7926070	0.7917484
7	259 43 42.7	4 48.99	17.2	0 26 15.9	6.22	0.7234943	0.7906305	0.7898536
11	260 2 58.9	4 49.13	16.9	0 25 51.0	6.24	0.7233824	0.7888183	0.7877250
15	260 22 15.7	4 49.28	16.7	0 25 26.0	6.25	0.7232702	0 7865741	0.7853659
19	260 41 33.1	4 49.43	16.4	0 25 1.0	6.27	0.7231577	0.7841007	0.7827787
23	261 0 51.2	4 49.58	−16.2	+0 24 35.9	−6.29	0.7230449	0.7814000	0.7799649
27	261 20 9.8	4 49.73	15.9	0 24 10.7	6.30	0.7229318	0.7784738	0.7769269
31	261 39 29.0	4 49.88	15.7	0 23 45.5	6.31	0.7228185	0.7753251	0.7736688
Feb. 4	261 58 48.8	4 50.03	15.4	0 23 20.2	6.33	0.7227049	0.7719590	0.7701965
8	262 18 9.3	4 50.19	15.2	0 22 54.8	6.34	0.7225911	0.7683820	0.7665164
12	262 37 30.3	4 50.34	−14.9	+0 22 29.4	−6.36	0.7224769	0.7646007	0.7626358
16	262 56 52.0	4 50.49	14.7	0 22 4.0	6.37	0.7223626	0.7606223	0.7585609
20	263 16 14.3	4 50.64	14.4	0 21 38.5	6.38	0.7222479	0.7564525	0.7542978
24	263 35 37.2	4 50.80	14.1	0 21 12.9	6.40	0.7221330	0.7520979	0.7498537
28	263 55 0.7	4 50.95	13.9	0 20 47.3	6.41	0.7220178	0.7475665	0.7452376
Mar. 4	264 14 24.8	4 51.10	−13.6	+0 20 21.6	−6.42	0.7219023	0.7428686	0.7404611
8	264 33 49.5	4 51.26	13.4	0 19 55.9	6.44	0.7217866	0.7380167	0.7355372
12	264 53 14.8	4 51.42	13.1	0 19 30.1	6.45	0.7216705	0.7330243	0.7304797
16	265 12 40.8	4 51.57	12.8	0 19 4.3	6.46	0.7215541	0.7279050	0.7253018
20	265 32 7.4	4 51.73	12.5	0 18 38.4	6.48	0.7214375	0.7226720	0.7200172
24	265 51 34.6	4 51.89	−12.3	+0 18 12.5	−6.49	0.7213207	0.7173396	0.7146411
28	266 11 2.5	4 52.04	12.0	0 17 46.5	6.50	0.7212036	0.7119244	0.7091917
Apr. 1	266 30 31.0	4 52.20	11.7	0 17 20.5	6.51	0.7210863	0.7064461	0.7036903
5	266 50 0.1	4 52.36	11.4	0 16 54.4	6.53	0.7209688	0.7009272	0.6981599
9	267 9 29.9	4 52.51	11.1	0 16 28.3	6.54	0.7208511	0.6953912	0.6926241
13	267 29 0.2	4 52.67	−10.9	+0 16 2.1	−6.55	0.7207331	0.6898616	0.6871067
17	267 48 31.2	4 52.83	10.6	0 15 35.9	6.56	0.7206149	0.6843628	0.6816329
21	268 8 2.8	4 52.99	10.3	0 15 9.6	6.57	0.7204966	0.6789205	0.6762288
25	268 27 35.1	4 53.15	10.0	0 14 43.3	6.58	0.7203781	0.6735619	0.6709238
29	268 47 8 0	4 53.31	9.7	0 14 17.0	6.59	0.7202595	0.6683187	0.6657505
May 3	269 6 41.6	4 53.47	− 9.4	+0 13 50.6	−6.60	0.7201406	0.6632237	0.6607425
7	269 26 15.8	4 53.63	9.1	0 13 24.2	6.61	0.7200216	0.6583110	0.6559331
11	269 45 50.6	4 53.79	8.9	0 12 57.7	6.62	0.7199024	0 6536129	0.6513542
15	270 5 26.1	4 53.95	8.6	0 12 31.2	6.63	0.7197830	0.6491610	0.6470372
19	270 25 2.2	4 54.11	8.3	0 12 4.7	6.64	0.7196634	0.6449868	0.6430137
23	270 44 39.0	4 54.27	− 8.0	+0 11 38.1	−6.65	0.7195436	0.6411220	0.6393161
27	271 4 16.4	4 54.43	7.7	0 11 11.5	6.66	0.7194236	0.6375999	0.6359774
31	271 23 54.4	4 54.59	7.4	0 10 44.8	6.67	0.7193034	0.6344522	0.6330283
June 4	271 43 33.1	4 54.76	7.1	0 10 18.1	6.68	0.7191830	0.6317082	0.6304951
8	272 3 12.5	4 54.92	6.8	0 9 51.4	6.69	0.7190625	0.6293912	0.6283991
12	272 22 52.5	4 55.09	− 6.5	+0 9 24.6	−6.69	0.7189418	0.6275205	0.6267574
16	272 42 33.2	4 55.25	6.2	0 8 57.9	6.70	0.7188210	0.6261114	0.6255843
20	273 2 14.5	4 55.41	5.9	0 8 31.0	6.71	0.7187000	0 6251771	0.6248911
24	273 21 56.5	4 55.58	5.6	0 8 4.2	6.72	0.7185788	0.6247271	0.6246863
28	273 41 39.1	4 55.74	5.3	0 7 37.3	6.73	0.7184575	0.6247681	0.6249725
July 2	274 1 22.4	4 55.91	− 5.0	+0 7 10.3	−6.74	0.7183360	0.6252983	0.6257447
6	274 21 6.4	4 56.07	− 4.6	+0 6 43.4	−6.74	0.7182144	0.6263097	0.6269920

JUPITER.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	′ ″	″	° ′ ″	″			
July 2	274 1 22.4	4 55.91	−5.0	+0 7 10.3	−6.74	0.7183360	0.6252983	0.6257447
6	274 21 6.4	4 56.07	4.6	0 6 43.4	6.74	0.7182144	0.6263097	0.6269920
10	274 40 51.0	4 56.24	4.3	0 6 16.4	6.75	0.7180926	0.6277890	0.6286988
14	275 0 36.3	4 56.41	4.0	0 5 49.4	6.76	0.7179706	0.6297187	0.6308466
18	275 20 22.3	4 56.58	3.7	0 5 22.4	6.76	0.7178486	0.6320795	0.6334150
22	275 40 8.9	4 56.74	−3.4	+0 4 55.3	−6.77	0.7177264	0.6348499	0.6363814
26	275 59 56.2	4 56.91	3.1	0 4 28.2	6.77	0.7176042	0.6380056	0.6397190
30	276 19 44.2	4 57.08	2.8	0 4 1.1	6.78	0.7174818	0.6415174	0.6433970
Aug. 3	276 39 32.9	4 57.25	2.5	0 3 34.0	6.79	0.7173593	0.6453532	0.6473818
7	276 59 22.2	4 57.41	2.2	0 3 6.8	6.79	0.7172367	0.6494785	0.6516391
11	277 19 12.2	4 57.58	−1.9	+0 2 39.6	−6.80	0.7171140	0.6538596	0.6561357
15	277 39 2.8	4 57.75	1.6	0 2 12.4	6.80	0.7169912	0.6584639	0.6608405
19	277 58 54.2	4 57.92	1.2	0 1 45.2	6.81	0.7168684	0.6632614	0.6657228
23	278 18 46.2	4 58.09	0.9	0 1 18.0	6.81	0.7167456	0.6682207	0.6707511
27	278 38 38.9	4 58.26	0.6	0 0 50.7	6.81	0.7166226	0.6733101	0.6758938
31	278 58 32.2	4 58.43	−0.3	+0 0 23.5	−6.82	0.7164996	0.6784982	0.6811193
Sept. 4	279 18 26.3	4 58.59	0.0	−0 0 3.8	6.82	0.7163766	0.6837539	0.6863981
8	279 38 21.0	4 58.76	+0.3	0 0 31.1	6.83	0.7162534	0.6890491	0.6917035
12	279 58 16.4	4 58.93	0.6	0 0 58.4	6.83	0.7161302	0.6943589	0.6970129
16	280 18 12.4	4 59.10	1.0	0 1 25.7	6.83	0.7160069	0.6996616	0.7023032
20	280 38 9.2	4 59.27	+1.3	−0 1 53.1	−6.84	0.7158835	0.7049349	0.7075541
24	280 58 6.6	4 59.44	1.6	0 2 20.4	6.84	0.7157601	0.7101582	0.7127444
28	281 18 4.7	4 59.61	1.9	0 2 47.8	6.84	0.7156365	0.7153103	0.7178533
Oct. 2	281 38 3.5	4 59.78	2.2	0 3 15.2	6.85	0.7155128	0.7203715	0.7228628
6	281 58 3.0	4 59.95	2.6	0 3 42.6	6.85	0.7153892	0.7253256	0.7277579
10	282 18 3.1	5 0.12	+2.9	−0 4 10.0	−6.85	0.7152654	0.7301584	0.7325256
14	282 38 4.0	5 0.30	3.2	0 4 37.4	6.85	0.7151417	0.7348580	0.7371541
18	282 58 5.5	5 0.47	3.5	0 5 4.8	6.85	0.7150179	0.7394126	0.7416323
22	283 18 7.7	5 0.64	3.8	0 5 32.2	6.85	0.7148941	0.7438114	0.7459482
26	283 38 10.6	5 0.81	4.1	0 5 59.6	6.86	0.7147702	0.7480416	0.7500900
30	283 58 14.2	5 0.98	+4.4	−0 6 27.0	−6.86	0.7146463	0.7520926	0.7540482
Nov. 3	284 18 18.4	5 1.15	4.7	0 6 54.4	6.86	0.7145224	0.7559561	0.7578154
7	284 38 23.4	5 1.32	5.0	0 7 21.9	6.86	0.7143985	0.7596255	0.7613858
11	284 58 29.0	5 1.50	5.3	0 7 49.3	6.86	0.7142747	0.7630956	0.7647543
15	285 18 35.3	5 1.67	5.7	0 8 16.7	6.85	0.7141508	0.7663611	0.7679152
19	285 38 42.4	5 1.84	+6.0	−0 8 44.1	−6.85	0.7140270	0.7694158	0.7708621
23	285 58 50.1	5 2.01	6.3	0 9 11.5	6.85	0.7139031	0.7722535	0.7735890
27	286 18 58.5	5 2.19	6.6	0 9 38.9	6.85	0.7137793	0.7748683	0.7760909
Dec. 1	286 39 7.6	5 2.36	6.9	0 10 6.4	6.85	0.7136555	0.7772566	0.7783650
5	286 59 17.3	5 2.53	7.2	0 10 33.8	6.85	0.7135317	0.7794159	0.7804093
9	287 19 27.8	5 2.70	+7.5	−0 11 1.2	−6.85	0.7134080	0.7813448	0.7822223
13	287 39 39.0	5 2.88	7.8	0 11 28.6	6.85	0.7132842	0.7830413	0.7838015
17	287 59 50.8	5 3.05	8.1	0 11 55.9	6.85	0.7131605	0.7845026	0.7851441
21	288 20 3.4	5 3.22	8.4	0 12 23.3	6.84	0.7130368	0.7857257	0.7862469
25	288 40 16.6	5 3.40	8.7	0 12 50.7	6.84	0.7129132	0.7867076	0.7871077
29	289 0 30.5	5 3.57	+9.0	−0 13 18.0	−6.84	0.7127896	0.7874472	0.7877261
33	289 20 45.2	5 3.74	+9.3	−0 13 45.4	−6.83	0.7126661	0.7879445	

SATURN.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	′ ″	′ ″	° ′ ″	″			
Jan. 3	135 43 28.8	2 10.58	+1 10.4	+0 58 27.2	+5.22	0.9617018	0.9212638	0.9202788
7	135 52 11.1	2 10.55	1 10.7	0 58 48.1	5.22	0.9617417	0.9193462	0.9184679
11	136 0 53.2	2 10.53	1 11.1	0 59 9.0	5.21	0.9617817	0.9176454	0.9168803
15	136 9 35.3	2 10.51	1 11.4	0 59 29.8	5.20	0.9618218	0.9161739	0.9155274
19	136 18 17.3	2 10.48	1 11.7	0 59 50.6	5.20	0.9618619	0.9149420	0.9144190
23	136 26 59.1	2 10.46	+1 12.1	+1 0 11.4	+5.19	0.9619022	0.9139595	0.9135649
27	136 35 40.9	2 10.43	1 12.4	1 0 32.1	5.18	0.9619426	0.9132356	0.9129725
31	136 44 22.6	2 10.41	1 12.7	1 0 52.8	5.18	0.9619831	0.9127761	0.9126474
Feb. 4	136 53 4.2	2 10.38	1 13.0	1 1 13.5	5.17	0.9620237	0.9125862	0.9125929
8	137 1 45.7	2 10.36	1 13.3	1 1 34.2	5.16	0.9620644	0.9126669	0.9128080
12	137 10 27.0	2 10.34	+1 13.7	+1 1 54.9	+5.16	0.9621052	0.9130156	0.9132893
16	137 19 8.3	2 10.31	1 14.0	1 2 15.5	5.15	0.9621461	0.9136284	0.9140322
20	137 27 49.5	2 10.29	1 14.3	1 2 36.1	5.14	0.9621871	0.9144999	0.9150308
24	137 36 30.6	2 10.26	1 14.6	1 2 56.6	5.14	0.9622282	0.9156236	0.9162773
28	137 45 11.6	2 10.24	1 15.0	1 3 17.2	5.13	0.9622694	0.9169905	0.9177622
Mar. 4	137 53 52.5	2 10.21	+1 15.3	+1 3 37.7	+5.12	0.9623106	0.9185906	0.9194740
8	138 2 33.3	2 10.19	1 15.6	1 3 58.2	5.12	0.9623520	0.9204104	0.9213978
12	138 11 14.0	2 10.16	1 15.9	1 4 18.6	5.11	0.9623935	0.9224344	0.9235182
16	138 19 54.6	2 10.14	1 16.2	1 4 39.0	5.10	0.9624351	0.9246471	0.9258189
20	138 28 35.1	2 10.11	1 16.5	1 4 59.4	5.09	0.9624767	0.9270319	0.9282842
24	138 37 15.5	2 10.08	+1 16.8	+1 5 19.8	+5.09	0.9625185	0.9295738	0.9308985
28	138 45 55.8	2 10.06	1 17.1	1 5 40.1	5.08	0.9625603	0.9322562	0.9336448
Apr. 1	138 54 35.9	2 10.03	1 17.4	1 6 0.4	5.07	0.9626023	0.9350620	0.9365054
5	139 3 16.0	2 10.01	1 17.7	1 6 20.7	5.06	0.9626443	0.9379728	0.9394618
9	139 11 56.0	2 9.98	1 18.0	1 6 40.9	5.06	0.9626865	0.9409702	0.9424958
13	139 20 35.9	2 9.96	+1 18.3	+1 7 1.1	+5.05	0.9627287	0.9440365	0.9455903
17	139 29 15.7	2 9.93	1 18.6	1 7 21.3	5.04	0.9627710	0.9471553	0.9487298
21	139 37 55.3	2 9.91	1 18.9	1 7 41.5	5.03	0.9628134	0.9503118	0.9518994
25	139 46 34.9	2 9.88	1 19.2	1 8 1.6	5.03	0.9628560	0.9534908	0.9550842
29	139 55 14.4	2 9.86	1 19.5	1 8 21.7	5.02	0.9628986	0.9566776	0.9582691
May 3	140 3 53.8	2 9.83	+1 19.8	+1 8 41.8	+5.01	0.9629413	0.9598568	0.9614390
7	140 12 33.0	2 9.80	1 20.1	1 9 1.8	5.01	0 9629840	0.9630140	0.9645801
11	140 21 12.2	2 9.78	1 20.3	1 9 21.8	5.00	0.9630269	0.9661360	0.9676802
15	140 29 51.2	2 9.75	1 20.6	1 9 41.8	4.99	0.9630699	0.9692115	0.9707285
19	140 38 30.2	2 9.73	1 20.9	1 10 1.8	4.98	0.9631130	0.9722299	0.9737145
23	140 47 9.1	2 9.70	+1 21.2	+1 10 21.7	+4.98	0.9631561	0.9751812	0.9766288
27	140 55 47.8	2 9.68	1 21.5	1 10 41.6	4.97	0.9631994	0.9780560	0.9794615
31	141 4 26.5	2 9.65	1 21.7	1 11 1.4	4.96	0.9632427	0.9808441	0.9822027
June 4	141 13 5.0	2 9.62	1 22.0	1 11 21.2	4.95	0.9632862	0.9835362	0.9848435
8	141 21 43.5	2 9.60	1 22.2	1 11 41.0	4.95	0.9633297	0.9861240	0.9873769
12	141 30 21.8	2 9.57	+1 22.5	+1 12 0.8	+4.94	0.9633733	0.9886015	0.9897970
16	141 39 0.0	2 9.54	1 22.8	1 12 20.5	4.93	0.9634170	0.9909628	0.9920982
20	141 47 38.2	2 9.52	1 23.0	1 12 40.2	4.92	0.9634608	0.9932025	0.9942749
24	141 56 16.2	2 9.49	1 23.3	1 12 59.9	4.91	0.9635047	0.9953147	0.9963212
28	142 4 54.1	2 9.47	1 23.5	1 13 19.5	4.90	0.9635486	0.9972937	0.9982315
July 2	142 13 31.9	2 9.44	+1 23.8	+1 13 39.1	+4.90	0.9635927	0.9991342	1.0000012
6	142 22 9.6	2 9.41	+1 24.0	+1 13 58.7	+4.89	0.9636368	1.0008320	1.0016262

SATURN.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	′ ″	′ ″	° ′ ″	″			
July 2	142 13 31.9	2 9.44	+1 23.8	+1 13 39.1	+4.90	0.9635927	0.9991342	1.0000012
6	142 22 9.6	2 9.41	1 24.0	1 13 58.7	4.89	0.9636368	1.0008320	1.0016262
10	142 30 47.2	2 9.39	1 24.3	1 14 18.3	4.88	0.9636810	1.0023837	1.0031042
14	142 39 24.7	2 9.36	1 24.5	1 14 37.8	4.87	0.9637254	1.0037874	1.0044328
18	142 48 2.1	2 9.33	1 24.8	1 14 57.2	4.86	0.9637698	1.0050401	1.0056091
22	142 56 39.3	2 9.31	+1 25.0	+1 15 16.7	+4.86	0.9638142	1.0061392	1.0066301
26	143 5 16.5	2 9.28	1 25.2	1 15 36.1	4.85	0.9638588	1.0070814	1.0074928
30	143 13 53.6	2 9.25	1 25.5	1 15 55.5	4.84	0.9639035	1.0078641	1.0081950
Aug. 3	143 22 30.6	2 9.23	1 25.7	1 16 14.8	4.83	0.9639482	1.0084854	1.0087353
7	143 31 7.4	2 9.20	1 26.0	1 16 34.1	4.82	0.9639931	1.0089447	1.0091135
11	143 39 44.2	2 9.17	+1 26.2	+1 16 53.4	+4.82	0.9640380	1.0092416	1.0093292
15	143 48 20.8	2 9.15	1 26.4	1 17 12.7	4.81	0.9640830	1.0093760	1.0093818
19	143 56 57.3	2 9.12	1 26.7	1 17 31.9	4.80	0.9641281	1.0093466	1.0092702
23	144 5 33.7	2 9.09	1 26.9	1 17 51.1	4.79	0.9641733	1.0091527	1.0089939
27	144 14 10.1	2 9.07	1 27.1	1 18 10.2	4.78	0.9642185	1.0087938	1.0085523
31	144 22 46.3	2 9.04	+1 27.3	+1 18 29.3	+4.77	0.9642639	1.0082697	1.0079463
Sept. 4	144 31 22.4	2 9.01	1 27.5	1 18 48.4	4.77	0.9643093	1.0075823	1.0071778
8	144 39 58.4	2 8.98	1 27.8	1 19 7.5	4.76	0.9643548	1.0067332	1.0062486
12	144 48 34.3	2 8.96	1 28.0	1 19 26.5	4.75	0.9644004	1.0057243	1.0051604
16	144 57 10.0	2 8.93	1 28.2	1 19 45.5	4.74	0.9644461	1.0045570	1.0039142
20	145 5 45.7	2 8.90	+1 28.4	+1 20 4.4	+4.73	0.9644918	1.0032323	1.0025116
24	145 14 21.3	2 8.87	1 28.6	1 20 23.3	4.72	0.9645376	1.0017525	1.0009551
28	145 22 56.7	2 8.85	1 28.8	1 20 42.2	4.71	0.9645835	1.0001201	0.9992481
Oct. 2	145 31 32.0	2 8.82	1 29.0	1 21 1.0	4.71	0.9646295	0.9983398	0.9973957
6	145 40 7.3	2 8.79	1 29.2	1 21 19.9	4.70	0.9646756	0.9964164	0.9954026
10	145 48 42.4	2 8.77	+1 29.4	+1 21 38.6	+4.69	0.9647217	0.9943548	0.9932735
14	145 57 17.4	2 8.74	1 29.6	1 21 57.4	4.68	0.9647680	0.9921595	0.9910133
18	146 5 52.3	2 8.71	1 29.8	1 22 16.1	4.67	0.9648143	0.9898356	0.9886269
22	146 14 27.1	2 8.68	1 30.1	1 22 34.7	4.66	0.9648607	0.9873884	0.9861209
26	146 23 1.7	2 8.66	1 30.3	1 22 53.4	4.66	0.9649071	0.9848255	0.9835032
30	146 31 36.3	2 8.63	+1 30.4	+1 23 12.0	+4.65	0.9649538	0.9821553	0.9807830
Nov. 3	146 40 10.8	2 8.60	1 30.5	1 23 30.6	4.64	0.9650004	0.9793875	0.9779699
7	146 48 45.1	2 8.57	1 30.7	1 23 49.1	4.63	0.9650471	0.9765314	0.9750734
11	146 57 19.4	2 8.54	1 30.9	1 24 7.6	4.62	0.9650939	0.9735968	0.9721033
15	147 5 53.5	2 8.52	1 31.1	1 24 26.1	4.61	0.9651408	0.9705938	0.9690698
19	147 14 27.5	2 8.49	+1 31.2	+1 24 44.5	+4.60	0.9651877	0.9675330	0.9659849
23	147 23 1.4	2 8.46	1 31.4	1 25 2.9	4.59	0.9652347	0.9644276	0.9628628
27	147 31 35.2	2 8.43	1 31.6	1 25 21.2	4.58	0.9652818	0.9612925	0.9597184
Dec. 1	147 40 8.8	2 8.40	1 31.7	1 25 39.5	4.57	0.9653290	0.9581425	0.9565667
5	147 48 42.4	2 8.37	1 31.9	1 25 57.8	4.57	0.9653762	0.9549928	0.9534227
9	147 57 15.8	2 8.35	+1 32.1	+1 26 16.1	+4.56	0.9654235	0.9518584	0.9503019
13	148 5 49.2	2 8.32	1 32.2	1 26 34.3	4.55	0.9654709	0.9487551	0.9472200
17	148 14 22.4	2 8.29	1 32.4	1 26 52.5	4.54	0.9655184	0.9456990	0.9441942
21	148 22 55.5	2 8.26	1 32.5	1 27 10.6	4.53	0.9655659	0.9427082	0.9412434
25	148 31 28.5	2 8.23	1 32.7	1 27 28.7	4.52	0.9656135	0.9398020	0.9383862
29	148 40 1.4	2 8.21	+1 32.8	+1 27 46.8	+4.51	0.9656612	0.9369985	0.9356412
33	148 48 34.1	2 8.18	+1 33.0	+1 28 4.8	+4.50	0.9657090	0.9343164	

URANUS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	″	″	° ′ ″	″			
Jan. 3	198 43 54.6	46.11	−8.8	+0 37 53.0	−0.36	1.2647217	1.2674862	1.2658808
11	198 50 3.5	46.10	8.8	0 37 50.2	0.36	1.2647384	1.2642613	1.2626359
19	198 56 12.3	46.10	8.9	0 37 47.3	0.36	1.2647551	1.2610116	1.2593964
27	199 2 21.0	46.09	8.9	0 37 44.4	0.36	1.2647718	1.2577978	1.2562250
Feb. 4	199 8 29.8	46.09	8.9	0 37 41.5	0.36	1.2647886	1.2546864	1.2531907
12	199 14 38.5	46.09	−8.9	+0 37 38.6	−0.36	1.2648054	1.2517458	1.2503598
20	199 20 47.1	46.08	8.9	0 37 35.7	0.36	1.2648223	1.2490392	1.2477918
28	199 26 55.7	46.08	8.9	0 37 32.8	0.36	1.2648393	1.2466248	1.2455457
Mar. 8	199 33 4.3	46.07	8.9	0 37 29.9	0.37	1.2648563	1.2445609	1.2436759
16	199 39 12.9	46.07	8.9	0 37 26.9	0.37	1.2648734	1.2428954	1.2422233
24	199 45 21.4	46.06	−8.9	+0 37 24.0	−0.37	1.2648905	1.2416632	1.2412193
Apr. 1	199 51 30.0	46.06	8.9	0 37 21.1	0.37	1.2649076	1.2408942	1.2406894
9	199 57 38.4	46.05	9.0	0 37 18.1	0.37	1.2649248	1.2406062	1.2406439
17	200 3 46.8	46.05	9.0	0 37 15.2	0.37	1.2649420	1.2408016	1.2410777
25	200 9 55.2	46.05	9.0	0 37 12.2	0.37	1.2649593	1.2414711	1.2419792
May 3	200 16 3.5	46.04	−9.0	+0 37 9.2	−0.37	1.2649767	1.2425990	1.2433261
11	200 22 11.8	46.04	9.0	0 37 6.3	0.37	1.2649940	1.2441551	1.2450810
19	200 28 20.1	46.03	9.0	0 37 3.3	0.37	1.2650115	1.2460981	1.2472009
27	200 34 28.3	46.03	9.0	0 37 0.3	0.37	1.2650290	1.2483838	1.2496401
June 4	200 40 36.5	46.02	9.0	0 36 57.3	0.38	1.2650465	1.2509625	1.2523432
12	200 46 44.7	46.02	−9.0	+0 36 54.3	−0.38	1.2650641	1.2537751	1.2552507
20	200 52 52.8	46.01	9.0	0 36 51.3	0.38	1.2650817	1.2567635	1.2583061
28	200 59 0.9	46.01	9.1	0 36 48.2	0.38	1.2650994	1.2598713	1.2614513
July 6	201 5 9.0	46.00	9.1	0 36 45.2	0.38	1.2651171	1.2630386	1.2646258
14	201 11 17.0	46.00	9.1	0 36 42.2	0.38	1.2651349	1.2662061	1.2677736
22	201 17 25.0	45.99	−9.1	+0 36 39.2	−0.38	1.2651527	1.2693219	1.2708442
30	201 23 32.9	45.99	9.1	0 36 36.1	0.38	1.2651706	1.2723343	1.2737858
Aug. 7	201 29 40.8	45.99	9.1	0 36 33.1	0.38	1.2651886	1.2751929	1.2765504
15	201 35 48.7	45.98	9.1	0 36 30.0	0.38	1.2652065	1.2778537	1.2790985
23	201 41 56.5	45.98	9.1	0 36 26.9	0.38	1.2652246	1.2802797	1.2813925
31	201 48 4.3	45.97	−9.1	+0 36 23.9	−0.38	1.2652426	1.2824326	1.2833960
Sept. 8	201 54 12.1	45.97	9.1	0 36 20.8	0.39	1.2652608	1.2842798	1.2850810
16	202 0 19.8	45.96	9.1	0 36 17.7	0.39	1.2652789	1.2857969	1.2864249
24	202 6 27.5	45.96	9.1	0 36 14.6	0.39	1.2652971	1.2869620	1.2874057
Oct. 2	202 12 35.1	45.95	9.1	0 36 11.5	0.39	1.2653154	1.2877544	1.2880070
10	202 18 42.7	45.95	−9.1	+0 36 8.4	−0.39	1.2653337	1.2881630	1.2882216
18	202 24 50.3	45.94	9.2	0 36 5.3	0.39	1.2653521	1.2881819	1.2880434
26	202 30 57.8	45.94	9.2	0 36 2.2	0.39	1.2653705	1.2878060	1.2874700
Nov. 3	202 37 5.3	45.93	9.2	0 35 59.1	0.39	1.2653889	1.2870370	1.2865084
11	202 43 12.8	45.93	9.2	0 35 55.9	0.39	1.2654075	1.2858862	1.2851717
19	202 49 20.2	45.92	−9.2	+0 35 52.8	−0.39	1.2654260	1.2843670	1.2834742
27	202 55 27.6	45.92	9.2	0 35 49.6	0.39	1.2654446	1.2824971	1.2814387
Dec. 5	203 1 34.9	45.91	9.2	0 35 46.5	0.39	1.2654633	1.2803038	1.2790970
13	203 7 42.2	45.91	9.2	0 35 43.3	0.40	1.2654820	1.2778221	1.2764839
21	203 13 49.5	45.91	9.2	0 35 40.2	0.40	1.2655008	1.2750876	1.2736389
29	203 19 56.7	45.90	−9.2	+0 35 37.0	−0.40	1.2655196	1.2721446	1.2706116
37	203 26 3.9	45.90	−9.2	+0 35 33.8	−0.40	1.2655384		

NEPTUNE.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	″	″	° ′ ″	″			
Jan. 3	61 9 54.6	21.99	−32.8	−1 39 59.5	+0.24	1.4745363	1.4639177	1.4646582
11	61 12 50.5	21.99	32.8	1 39 57.6	0.24	1.4745374	1.4654468	1.4662789
19	61 15 46.4	21.99	32.9	1 39 55.7	0.24	1.4745385	1.4671500	1.4680557
27	61 18 42.4	21.99	33.0	1 39 53.8	0.24	1.4745396	1.4689911	1.4699515
Feb. 4	61 21 38.3	21.99	33.0	1 39 51.8	0.24	1.4745408	1.4709315	1.4719257
12	61 24 34.2	21.99	−33.1	−1 39 49.9	+0.24	1.4745419	1.4729291	1.4739366
20	61 27 30.2	21.99	33.2	1 39 48.0	0.24	1.4745431	1.4749436	1.4759456
28	61 30 26.1	21.99	33.2	1 39 46.0	0.24	1.4745442	1.4769377	1.4779150
Mar. 8	61 33 22.0	21.99	33.3	1 39 44.0	0.24	1.4745454	1.4788732	1.4798073
16	61 36 18.0	21.99	33.4	1 39 42.1	0.25	1.4745466	1.4807140	1.4815893
24	61 39 13.9	21.99	−33.4	−1 39 40.1	+0.25	1.4745478	1.4824300	1.4832324
Apr. 1	61 42 9.9	21.99	33.5	1 39 38.2	0.25	1.4745490	1.4839934	1.4847091
9	61 45 5.8	21.99	33.6	1 39 36.2	0.25	1.4745502	1.4853775	1.4859957
17	61 48 1.7	21.99	33.6	1 39 34.2	0.25	1.4745514	1.4865621	1.4870745
25	61 50 57.7	21.99	33.7	1 39 32.2	0.25	1.4745526	1.4875313	1.4879304
May 3	61 53 53.6	21.99	−33.7	−1 39 30.2	+0.25	1.4745538	1.4882707	1.4885504
11	61 56 49.5	21.99	33.8	1 39 28.2	0.25	1.4745551	1.4887695	1.4889272
19	61 59 45.5	21.99	33.9	1 39 26.2	0.25	1.4745563	1.4890234	1.4890574
27	62 2 41.4	21.99	33.9	1 39 24.2	0.25	1.4745576	1.4890295	1.4889397
June 4	62 5 37.3	21.99	34.0	1 39 22.2	0.25	1.4745589	1.4887885	1.4885762
12	62 8 33.3	21.99	−34.0	−1 39 20.2	+0.25	1.4745601	1.4883042	1.4879737
20	62 11 29.3	21.99	34.1	1 39 18.2	0.25	1.4745614	1.4875859	1.4871419
28	62 14 25.2	21.99	34.2	1 39 16.2	0.25	1.4745627	1.4866435	1.4860919
July 6	62 17 21.1	21.99	34.2	1 39 14.2	0.25	1.4745640	1.4854901	1.4848404
14	62 20 17.1	21.99	34.3	1 39 12.2	0.25	1.4745653	1.4841454	1.4834073
22	62 23 13.0	21.99	−34.3	−1 39 10.1	+0.25	1.4745666	1.4826290	1.4818130
30	62 26 9.0	21.99	34.4	1 39 8.1	0.25	1.4745680	1.4809631	1.4800825
Aug. 7	62 29 4.9	21.99	34.5	1 39 6.0	0.26	1.4745693	1.4791751	1.4782449
15	62 32 0.9	21.99	34.5	1 39 4.0	0.26	1.4745707	1.4772954	1.4763302
23	62 34 56.8	21.99	34.6	1 39 2.0	0.26	1.4745721	1.4753537	1.4743700
31	62 37 52.8	21.99	−34.6	−1 38 59.9	+0.26	1.4745734	1.4733840	1.4724004
Sept. 8	62 40 48.7	21.99	34.7	1 38 57.9	0.26	1.4745748	1.4714237	1.4704583
16	62 43 44.7	21.99	34.8	1 38 55.8	0.26	1.4745762	1.4695088	1.4685797
24	62 46 40.7	21.99	34.8	1 38 53.7	0.26	1.4745776	1.4676758	1.4668020
Oct. 2	62 49 36.6	22.00	34.9	1 38 51.7	0.26	1.4745790	1.4659630	1.4651638
10	62 52 32.6	22.00	−34.9	−1 38 49.6	+0.26	1.4745804	1.4644079	1.4636994
18	62 55 28.5	22.00	35.0	1 38 47.5	0.26	1.4745818	1.4630423	1.4624409
26	62 58 24.5	22.00	35.1	1 38 45.4	0.26	1.4745833	1.4618984	1.4614189
Nov. 3	63 1 20.5	22.00	35.1	1 38 43.4	0.26	1.4745847	1.4610046	1.4606583
11	63 4 16.4	22.00	35.2	1 38 41.3	0.26	1.4745861	1.4603816	1.4601764
19	63 7 12.4	22.00	−35.2	−1 38 39.2	+0.26	1.4745876	1.4600441	1.4599867
27	63 10 8.4	22.00	35.3	1 38 37.1	0.26	1.4745891	1.4600039	1.4600965
Dec. 5	63 13 4.3	22.00	35.4	1 38 35.0	0.26	1.4745905	1.4602631	1.4605030
13	63 16 0.3	22.00	35.4	1 38 32.9	0.26	1.4745920	1.4608147	1.4611972
21	63 18 56.3	22.00	35.5	1 38 30.8	0.26	1.4745935	1.4616479	1.4621651
29	63 21 52.3	22.00	−35.5	−1 38 28.6	+0.26	1.4745950	1.4627448	1.4633842
37	63 24 48.2	22.00	−35.6	−1 38 26.5	+0.27	1.4745965	1.4640785	

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Jan. 1	+0.1933986	+0.2019712	+729	−0.8843907	−0.8827783	+206	−0.3836730	−0.3829739	−107
2	0.2105279	0.2190682	718	0.8810967	0.8793461	216	0.3822445	0.3814854	102
3	0.2275913	0.2360965	707	0.8775267	0.8756387	225	0.3806965	0.3798778	96
4	0.2445832	0.2530503	696	0.8736822	0.8716575	234	0.3790295	0.3781515	91
5	0.2614976	0.2699238	685	0.8695647	0.8674041	243	0.3772439	0.3763070	85
6	+0.2783288	+0.2867115	+674	−0.8651759	−0.8628803	+251	−0.3753405	−0.3743449	− 80
7	0.2950716	0.3034083	663	0.8605174	0.8580876	259	0.3733200	0.3722661	74
8	0.3117210	0.3200091	651	0.8555909	0.8530278	267	0.3711832	0.3700714	69
9	0.3282719	0.3365088	640	0.8503984	0.8477030	275	0.3689307	0.3677614	63
10	0.3447192	0.3529025	628	0.8449418	0.8421152	282	0.3665634	0.3653371	58
11	+0.3610580	+0.3691852	+617	−0.8392232	−0.8362664	+289	−0.3640824	−0.3627995	− 53
12	0.3772833	0.3853519	605	0.8332448	0.8301588	295	0.3614886	0.3601495	48
13	0.3933904	0.4013981	594	0.8270086	0.8237944	301	0.3587827	0.3573880	43
14	0.4093746	0.4173191	582	0.8205165	0.8171752	307	0.3559657	0.3545158	38
15	0.4252312	0.4331103	571	0.8137707	0.8103034	313	0.3530386	0.3515340	33
16	+0.4409557	+0.4487671	+559	−0.8067734	−0.8031813	+318	−0.3500024	−0.3484436	− 29
17	0.4565438	0.4642853	548	0.7995269	0.7958109	323	0.3468580	0.3452456	24
18	0.4719910	0.4796604	536	0.7920332	0.7881944	327	0.3436065	0.3419409	20
19	0.4872929	0.4948880	524	0.7842944	0.7803338	332	0.3402488	0.3385304	15
20	0.5024450	0.5099635	512	0.7763126	0.7722313	336	0.3367858	0.3350150	11
21	+0.5174427	+0.5248823	+500	−0.7680901	−0.7638893	+340	−0.3332184	−0.3313959	− 6
22	0.5322815	0.5396399	489	0.7596293	0.7553103	343	0.3295478	0.3276741	− 2
23	0.5469567	0.5542316	477	0.7509327	0.7464965	347	0.3257750	0.3238506	+ 2
24	0.5614638	0.5686530	466	0.7420024	0.7374503	350	0.3219009	0.3199263	6
25	0.5757983	0.5828994	454	0.7328408	0.7281743	353	0.3179267	0.3159025	10
26	+0.5899554	+0.5969660	+443	−0.7234509	−0.7186713	+355	−0.3138536	−0.3117804	+ 14
27	0.6039303	0.6108481	432	0.7138356	0.7089443	358	0.3096827	0.3075611	18
28	0.6177185	0.6245411	421	0.7039978	0.6989964	360	0.3054154	0.3032460	22
29	0.6313153	0.6380406	410	0.6939405	0.6888306	362	0.3010530	0.2988366	26
30	0.6447164	0.6513422	399	0.6836670	0.6784504	363	0.2965969	0.2943342	30
31	+0.6579174	+0.6644415	+388	−0.6731809	−0.6678593	+365	−0.2920486	−0.2897403	+ 33
Feb. 1	0.6709138	0.6773341	377	0.6624858	0.6570609	366	0.2874094	0.2850563	37
2	0.6837016	0.6900161	366	0.6515850	0.6460586	366	0.2826809	0.2802837	40
3	0.6962769	0.7024836	355	0.6404821	0.6348562	367	0.2778646	0.2754241	44
4	0.7086357	0.7147327	344	0.6291810	0.6234577	367	0.2729622	0.2704794	47
5	+0.7207743	+0.7267598	+334	−0.6176861	−0.6118674	+368	−0.2679756	−0.2654513	+ 50
6	0.7326888	0.7385611	323	0.6060016	0.6000894	368	0.2629065	0.2603416	53
7	0.7443760	0.7501334	313	0.5941313	0.5881274	368	0.2577566	0.2551519	56
8	0.7558327	0.7614737	303	0.5820786	0.5759852	368	0.2525275	0.2498839	59
9	0.7670558	0.7725788	293	0.5698476	0.5636668	368	0.2472210	0.2445394	62
10	+0.7780421	+0.7834457	+283	−0.5574427	−0.5511765	+368	−0.2418389	−0.2391202	+ 65
11	0.7887889	0.7940717	273	0.5448682	0.5385186	367	0.2363831	0.2336281	67
12	0.7992937	0.8044544	263	0.5321279	0.5256969	366	0.2308553	0.2280650	70
13	0.8095536	0.8145908	254	0.5192256	0.5127150	365	0.2252573	0.2224325	72
14	0.8195656	0.8244778	244	0.5061651	0.4995768	364	0.2195906	0.2167321	75
15	+0.8293269	+0.8341128	+235	−0.4929503	−0.4862863	+362	−0.2138570	−0.2109657	+ 77

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Feb. 15	+0.8293269	+0.8341128	+235	−0.4929503	−0.4862863	+362	−0.2138570	−0.2109657	+ 77
16	0.8388350	0.8434934	225	0.4795850	0.4728471	361	0.2080583	0.2051350	80
17	0.8480877	0.8526175	216	0.4660730	0.4592632	359	0.2021960	0.1992416	82
18	0.8570825	0.8614824	207	0.4524181	0.4455385	357	0.1962719	0.1932873	84
19	0.8658167	0.8700853	198	0.4386246	0.4316772	355	0.1902878	0.1872739	86
20	+0.8742877	+0.8784237	+189	−0.4246967	−0.4176835	+353	−0.1842455	−0.1812032	+ 88
21	0.8824928	0.8864950	181	0.4106384	0.4035614	351	0.1781468	0.1750769	89
22	0.8904296	0.8942967	172	0.3964534	0.3893147	349	0.1719933	0.1688966	91
23	0.8980955	0.9018261	164	0.3821459	0.3749476	346	0.1657867	0.1626642	93
24	0.9054878	0.9090806	156	0.3677202	0.3604645	344	0.1595290	0.1563817	95
25	+0.9126041	+0.9160580	+148	−0.3531809	−0.3458701	+341	−0.1532221	−0.1500509	+ 96
26	0.9194421	0.9227561	140	0.3385327	0.3311692	338	0.1468679	0.1436738	98
27	0.9259998	0.9291728	132	0.3237803	0.3163664	335	0.1404685	0.1372525	99
28	0.9322750	0.9353061	124	0.3089282	0.3014664	332	0.1340258	0.1307889	100
Mar. 1	0.9382658	0.9411540	117	0.2939813	0.2864739	329	0.1275418	0.1242851	101
2	+0.9439704	+0.9467147	+109	−0.2789444	−0.2713938	+326	−0.1210187	−0.1177432	+102
3	0.9493868	0.9519864	102	0.2638224	0.2562312	323	0.1144586	0.1111654	103
4	0.9545134	0.9569677	95	0.2486205	0.2409912	320	0.1078636	0.1045538	104
5	0.9593492	0.9616578	88	0.2333437	0.2256788	316	0.1012359	0.0979106	105
6	0.9638934	0.9660559	81	0.2179970	0.2102990	313	0.0945778	0.0912381	106
7	+0.9681452	+0.9701610	+ 74	−0.2025853	−0.1948567	+309	−0.0878915	−0.0845385	+107
8	0.9721035	0.9739721	67	0.1871137	0.1793570	306	0.0811790	0.0778137	108
9	0.9757672	0.9774884	61	0.1715872	0.1638047	302	0.0744424	0.0710658	108
10	0.9791357	0.9807093	54	0.1560103	0.1482045	298	0.0676839	0.0642972	109
11	0.9822089	0.9836349	48	0.1403879	0.1325612	294	0.0609057	0.0575099	109
12	+0.9849868	+0.9862650	+ 42	−0.1247249	−0.1168795	+290	−0.0541098	−0.0507059	+109
13	0.9874693	0.9885996	36	0.1090256	0.1011637	286	0.0472982	0.0438871	109
14	0.9896560	0.9906383	30	0.0932943	0.0854181	282	0.0404728	0.0370555	110
15	0.9915465	0.9923806	25	0.0775356	0.0696474	278	0.0336355	0.0302132	110
16	0.9931406	0.9938264	19	0.0617542	0.0538563	274	0.0267885	0.0233621	110
17	+0.9944383	+0.9949759	+ 14	−0.0459547	−0.0380493	+269	−0.0199339	−0.0165043	+110
18	0.9954395	0.9958290	9	0.0301413	0.0222307	265	0.0130735	0.0096416	110
19	0.9961443	0.9963855	+ 4	−0.0143184	−0.0064048	260	−0.0062090	−0.0027759	110
20	0.9965525	0.9966453	0	+0.0015095	+0.0094240	256	+0.0006576	+0.0040910	110
21	0.9966639	0.9966082	− 5	0.0173382	0.0252513	251	0.0075244	0.0109571	110
22	+0.9964783	+0.9962743	− 9	+0.0331631	+0.0410725	+246	+0.0143893	+0.0178204	+110
23	0.9959959	0.9956435	14	0.0489794	0.0568829	241	0.0212504	0.0246789	110
24	0.9952168	0.9947160	18	0.0647827	0.0726779	236	0.0281058	0.0315307	110
25	0.9941410	0.9934919	23	0.0805682	0.0884527	231	0.0349534	0.0383737	110
26	0.9927687	0.9919715	27	0.0963310	0.1042024	226	0.0417913	0.0452059	110
27	+0.9911001	+0.9901551	− 31	+0.1120663	+0.1199221	+221	+0.0486173	+0.0520251	+110
28	0.9891358	0.9880432	35	0.1277694	0.1356072	216	0.0554293	0.0588293	110
29	0.9868765	0.9856367	38	0.1434353	0.1512527	210	0.0622252	0.0656165	109
30	0.9843232	0.9829365	41	0.1590590	0.1668535	205	0.0690031	0.0723846	109
31	0.9814765	0.9799435	44	0.1746359	0.1824050	199	0.0757608	0.0791314	109
32	+0.9783373	+0.9766586	− 47	+0.1901610	+0.1979022	+194	+0.0824961	+0.0858547	+109

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Apr. 1	+0.9783373	+0.9766586	−47	+0.1901610	+0.1979022	+194	+0.0824961	+0.0858547	+109
2	0.9749070	0.9730832	50	0.2056289	0.2133400	188	0.0892067	0.0925522	108
3	0.9711871	0.9692190	53	0.2210349	0.2287135	183	0.0958906	0.0992220	107
4	0.9671791	0.9650676	55	0.2363745	0.2440181	177	0.1025459	0.1058621	106
5	0.9628848	0.9606309	57	0.2516431	0.2592493	172	0.1091705	0.1124706	105
6	+0.9583062	+0.9559109	−59	+0.2668360	+0.2744026	+166	+0.1157624	+0.1190454	+105
7	0.9534452	0.9509095	61	0.2819487	0.2894737	160	0.1223196	0.1255845	104
8	0.9483038	0.9456287	62	0.2969770	0.3044582	154	0.1288402	0.1320861	104
9	0.9428841	0.9400708	64	0.3119166	0.3193520	148	0.1353222	0.1385482	103
10	0.9371884	0.9342378	65	0.3267635	0.3341509	142	0.1417639	0.1449691	103
11	+0.9312187	+0.9281319	−67	+0.3415136	+0.3488510	+136	+0.1481636	+0.1513471	+102
12	0.9249771	0.9217552	67	0.3561628	0.3634483	130	0.1545194	0.1576803	101
13	0.9184660	0.9151101	68	0.3707072	0.3779389	124	0.1608296	0.1639671	100
14	0.9116876	0.9081988	68	0.3851431	0.3923191	118	0.1670925	0.1702058	100
15	0.9046440	0.9010234	68	0.3994667	0.4065850	112	0.1733066	0.1763948	99
16	+0.8973373	+0.8935860	−68	+0.4136740	+0.4207329	+106	+0.1794701	+0.1825324	+ 99
17	0.8897697	0.8858888	68	0.4277614	0.4347590	100	0.1855814	0.1886170	98
18	0.8819434	0.8779340	68	0.4417253	0.4486598	94	0.1916390	0.1946471	98
19	0.8738606	0.8697237	68	0.4555620	0.4624314	88	0.1976412	0.2006210	97
20	0.8655234	0.8612601	67	0.4692676	0.4760699	82	0.2035864	0.2065371	96
21	+0.8569339	+0.8525454	−66	+0.4828380	+0.4895713	+ 76	+0.2094731	+0.2123938	+ 95
22	0.8480946	0.8435822	65	0.4962692	0.5029315	70	0.2152994	0.2181894	94
23	0.8390082	0.8343732	64	0.5095575	0.5161468	64	0.2210636	0.2239220	93
24	0.8296773	0.8249209	62	0.5226988	0.5292131	58	0.2267641	0.2295900	93
25	0.8201043	0.8152278	60	0.5356892	0.5421266	52	0.2323993	0.2351918	92
26	+0.8102917	+0.8052965	−58	+0.5485247	+0.5548832	+ 46	+0.2379674	+0.2407257	+ 92
27	0.8002424	0.7951301	56	0.5612014	0.5674790	40	0.2434667	0.2461901	91
28	0.7899596	0.7847319	53	0.5737155	0.5799104	34	0.2488957	0.2515833	90
29	0.7794469	0.7741054	50	0.5860633	0.5921736	28	0.2542527	0.2569036	89
30	0.7687076	0.7632541	47	0.5982408	0.6042646	22	0.2595359	0.2621494	89
May 1	+0.7577452	+0.7521814	−44	+0.6102442	+0.6161797	+ 16	+0.2647438	+0.2673190	+ 88
2	0.7465629	0.7408905	40	0.6220703	0.6279157	11	0.2698748	0.2724110	88
3	0.7351643	0.7293852	37	0.6337155	0.6394691	+ 5	0.2749274	0.2774239	87
4	0.7235534	0.7176697	33	0.6451764	0.6508366	0	0.2799002	0.2823562	87
5	0.7117344	0.7057482	29	0.6564497	0.6620152	− 5	0.2847917	0.2872065	86
6	+0.6997113	+0.6936245	−25	+0.6675326	+0.6730020	− 10	+0.2896005	+0.2919735	+ 86
7	0.6874878	0.6813022	21	0.6784225	0.6837941	15	0.2943255	0.2966561	86
8	0.6750677	0.6687852	16	0.6891163	0.6943888	20	0.2989653	0.3012530	86
9	0.6624549	0.6560775	11	0.6996114	0.7047836	25	0.3035188	0.3057630	85
10	0.6496535	0.6431832	6	0.7099052	0.7149759	30	0.3079849	0.3101849	85
11	+0.6366673	+0.6301062	− 1	+0.7199954	+0.7249634	− 35	+0.3123625	+0.3145178	+ 85
12	0.6235002	0.6168500	+ 5	0.7298795	0.7347435	40	0.3166505	0.3187606	85
13	0.6101558	0.6034184	11	0.7395550	0.7443138	45	0.3208479	0.3229123	85
14	0.5966379	0.5898152	17	0.7490196	0.7536721	49	0.3249537	0.3260719	85
15	0.5829504	0.5760443	23	0.7582710	0.7628160	54	0.3289668	0.3309383	85
16	+0.5690972	+0.5621096	+29	+0.7673069	+0.7717433	− 58	+0.3328862	+0.3348105	+ 85

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Rednc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Rednc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Redno. to Mean Eq'x of Jan. 0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
May 16	+0.5690972	+0.5621096	+ 29	+0.7673069	+0.7717433	−58	+0.3328862	+0.3348105	+ 85
17	0.5550819	0.5480146	35	0.7761250	0.7804516	62	0.3367110	0.3385877	84
18	0.5409080	0.5337628	42	0.7847230	0.7889386	65	0.3404404	0.3422690	84
19	0.5265791	0.5193580	49	0.7930985	0.7972020	68	0.3440733	0.3458533	84
20	0.5120994	0.5048043	56	0.8012491	0.8052394	72	0.3476087	0.3493395	84
21	+0.4974730	+0.4901058	+ 63	+0.8091726	+0.8130484	−75	+0.3510455	+0.3527267	+ 84
22	0.4827037	0.4752665	70	0.8168665	0.8206265	77	0.3543828	0.3560139	84
23	0.4677953	0.4602903	77	0.8243281	0.8279711	80	0.3576195	0.3591999	84
24	0.4527522	0.4451817	85	0.8315551	0.8350800	82	0.3607545	0.3622837	84
25	0.4375791	0.4299450	93	0.8385455	0.8419513	84	0.3637870	0.3652646	84
26	+0.4222800	+0.4145844	+101	+0.8452973	+0.8485830	−86	+0.3667162	+0.3681418	+ 84
27	0.4068591	0.3991044	109	0.8518084	0.8549729	88	0.3695412	0.3709143	84
28	0.3913211	0.3835097	117	0.8580766	0.8611188	90	0.3722609	0.3735810	85
29	0.3756710	0.3678054	126	0.8640997	0.8670187	92	0.3748743	0.3761410	85
30	0.3599136	0.3519962	134	0.8698759	0.8726710	93	0.3773808	0.3785937	86
31	+0.3440537	+0.3360869	+142	+0.8754038	+0.8780742	−94	+0.3797796	+0.3809385	+ 86
June 1	0.3280963	0.3200826	151	0.8806819	0.8832270	95	0.3820702	0.3831746	87
2	0.3120463	0.3039882	160	0.8857090	0.8881281	95	0.3842518	0.3853015	88
3	0.2959087	0.2878086	169	0.8904839	0.8927765	95	0.3863238	0.3873186	89
4	0.2796883	0.2715486	178	0.8950055	0.8971712	95	0.3882859	0.3892256	90
5	+0.2633901	+0.2552132	+187	+0.8992730	+0.9013113	−94	+0.3901377	+0.3910221	91
6	0.2470187	0.2388071	196	0.9032855	0.9051959	93	0.3918789	0.3927077	92
7	0.2305791	0.2223352	205	0.9070422	0.9088244	92	0.3935089	0.3942821	93
8	0.2140760	0.2058019	214	0.9105425	0.9121963	91	0.3950274	0.3957449	94
9	0.1975137	0.1892118	223	0.9137859	0.9153111	90	0.3964343	0.3970959	95
10	+0.1808969	+0.1725696	+232	+0.9167718	+0.9181682	−88	+0.3977294	+0.3983350	+ 96
11	0.1642303	0.1558797	241	0.9194999	0.9207671	86	0.3989125	0.3994620	98
12	0.1475182	0.1391465	250	0.9219696	0.9231074	84	0.3999834	0.4004768	99
13	0.1307650	0.1223743	259	0.9241806	0.9251888	81	0.4009420	0.4013791	101
14	0.1139751	0.1055677	268	0.9261323	0.9270106	78	0.4017880	0.4021687	102
15	+0.0971529	+0.0887311	+277	+0.9278239	+0.9285720	−74	+0.4025211	+0.4028454	+104
16	0.0803028	0.0718687	286	0.9292549	0.9298726	71	0.4031413	0.4034090	105
17	0.0634291	0.0549848	295	0.9304250	0.9309121	67	0.4036484	0.4038595	107
18	0.0465362	0.0380842	304	0.9313340	0.9316904	63	0.4040423	0.4041967	108
19	0.0296290	0.0211715	313	0.9319815	0.9322070	58	0.4043228	0.4044204	110
20	+0.0127121	+0.0042514	+322	+0.9323668	+0.9324610	−53	+0.4044896	+0.4045303	+111
21	−0.0042100	−0.0126716	330	0.9324893	0.9324520	48	0.4045426	0.4045263	113
22	0.0211327	0.0295927	339	0.9323489	0.9321798	43	0.4044817	0.4044084	115
23	0.0380509	0.0465069	347	0.9319451	0.9316442	37	0.4043067	0.4041764	117
24	0.0549597	0.0634091	355	0.9312776	0.9308150	31	0.4040175	0.4038301	119
25	−0.0718542	−0.0802944	+363	+0.9303466	+0.9297824	−25	+0.4036141	+0.4033697	+121
26	0.0887293	0.0971577	371	0.9291524	0.9284566	18	0.4030966	0.4027952	123
27	0.1055796	0.1139939	379	0.9276952	0.9268679	11	0.4024651	0.4021067	126
28	0.1224002	0.1307979	387	0.9259751	0.9250165	− 4	0.4017196	0.4013042	128
29	0.1391862	0.1475647	395	0.9239925	0.9229031	+ 3	0.4008603	0.4003881	131
30	−0.1559327	−0.1642894	+403	+0.9217484	+0.9205287	+10	+0.3998875	+0.3993587	+133

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
July 1	−0.1726343	−0.1809667	+410	+0.9192439	+0.9178943	+ 18	+0.3988016	+0.3982164	+136
2	0.1892859	0.1975916	417	0.9164799	0.9150008	26	0.3976030	0.3969616	138
3	0.2058828	0.2141594	424	0.9134572	0.9118491	35	0.3962920	0.3955946	140
4	0.2224202	0.2306651	431	0.9101767	0.9084403	44	0.3948691	0.3941160	142
5	0.2388933	0.2471043	437	0.9066399	0.9047758	53	0.3933349	0.3925264	145
6	−0.2552975	−0.2634724	+444	+0.9028482	+0.9008572	+ 62	+0.3916900	+0.3908263	+148
7	0.2716284	0.2797650	450	0.8988031	0.8966859	72	0.3899349	0.3890163	151
8	0.2878816	0.2959778	455	0.8945058	0.8922631	81	0.3880702	0.3870970	153
9	0.3040530	0.3121066	461	0.8899577	0.8875901	91	0.3860966	0.3850692	156
10	0.3201381	0.3281469	466	0.8851602	0.8826685	101	0.3840148	0.3829336	158
11	−0.3361324	−0.3440943	+472	+0.8801150	+0.8775000	+111	+0.3818254	+0.3806907	+161
12	0.3520318	0.3599447	477	0.8748236	0.8720860	121	0.3795292	0.3783413	163
13	0.3678323	0.3756943	482	0.8692873	0.8664277	132	0.3771268	0.3758860	166
14	0.3835301	0.3913392	486	0.8635074	0.8605265	143	0.3746187	0.3733253	169
15	0.3991210	0.4068752	490	0.8574852	0.8543836	154	0.3720055	0.3706598	172
16	−0.4146009	−0.4222979	+494	+0.8512219	+0.8480004	+165	+0.3692879	+0.3678903	+175
17	0.4299653	0.4376030	497	0.8447192	0.8413786	176	0.3664666	0.3650174	178
18	0.4452100	0.4527861	500	0.8379788	0.8345199	187	0.3635423	0.3620418	181
19	0.4603306	0.4678430	503	0.8310021	0.8274256	199	0.3605156	0.3589641	184
20	0.4753228	0.4827694	506	0.8237904	0.8200970	210	0.3573871	0.3557850	187
21	−0.4901823	−0.4975610	+508	+0.8163454	+0.8125360	+222	+0.3541576	+0.3525052	+191
22	0.5049047	0.5122132	510	0.8086690	0.8047446	233	0.3508278	0.3491256	194
23	0.5194854	0.5267213	511	0.8007630	0.7967246	245	0.3473986	0.3456469	198
24	0.5339199	0.5410810	512	0.7926295	0.7884782	257	0.3438707	0.3420700	201
25	0.5482038	0.5552880	513	0.7842707	0.7800076	269	0.3402451	0.3383959	205
26	−0.5623328	−0.5693379	+513	+0.7756889	+0.7713151	+281	+0.3365227	+0.3346255	+208
27	0.5763025	0.5832262	514	0.7668863	0.7624030	294	0.3327046	0.3307599	212
28	0.5901084	0.5969487	514	0.7578655	0.7532741	306	0.3287918	0.3268002	215
29	0.6037463	0.6105010	514	0.7486293	0.7439313	319	0.3247854	0.3227475	219
30	0.6172120	0.6238790	513	0.7391806	0.7343775	332	0.3206866	0.3186030	222
31	−0.6305014	−0.6370787	+512	+0.7295224	+0.7246156	+345	+0.3164967	+0.3143680	+225
Aug. 1	0.6436105	0.6500962	511	0.7196574	0.7146483	358	0.3122170	0.3100439	228
2	0.6565355	0.6629279	509	0.7095886	0.7044788	370	0.3078489	0.3056321	232
3	0.6692730	0.6755703	507	0.6993192	0.6941103	383	0.3033936	0.3011338	235
4	0.6818196	0.6880199	504	0.6888525	0.6835461	396	0.2988526	0.2965504	239
5	−0.6941714	−0.7002733	+501	+0.6781916	+0.6727893	+409	+0.2942272	+0.2918832	+242
6	0.7063255	0.7123273	498	0.6673397	0.6618431	421	0.2895187	0.2871337	246
7	0.7182786	0.7241789	494	0.6562999	0.6507105	434	0.2847285	0.2823032	249
8	0.7300278	0.7358250	490	0.6450752	0.6393944	446	0.2798581	0.2773932	252
9	0.7415699	0.7472623	486	0.6336684	0.6278978	459	0.2749089	0.2724051	255
10	−0.7529017	−0.7584877	+481	+0.6220828	+0.6162240	+471	+0.2698821	+0.2673401	+259
11	0.7640209	0.7694981	476	0.6103216	0.6043761	483	0.2647791	0.2621996	262
12	0.7749218	0.7802907	471	0.5983878	0.5923571	495	0.2596014	0.2569849	266
13	0.7656045	0.7908629	466	0.5862843	0.5801699	508	0.2543502	0.2516974	269
14	0.7960654	0.8012116	460	0.5740140	0.5678175	520	0.2490267	0.2463383	273
15	−0.8063012	−0.8113336	+454	+0.5615802	+0.5553031	+532	+0.2436324	+0.2409091	+276

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Aug. 16	–0.8163085	–0.8212254	+447	+0.5489860	+0.5426298	+544	+0.2381687	+0.2354112	+279
17	0.8260840	0.8308839	440	0.5362345	0.5298008	556	0.2326369	0.2298459	282
18	0.8356247	0.8403061	433	0.5233289	0.5168194	568	0.2270385	0.2242147	286
19	0.8449276	0.8494892	426	0.5102726	0.5036891	580	0.2213747	0.2185189	290
20	0.8539900	0.8584301	418	0.4970691	0.4904133	591	0.2156472	0.2127600	293
21	–0.8626088	–0.8671257	+410	+0.4837220	+0.4769956	+603	+0.2098574	+0.2069396	+296
22	0.8713806	0.8755727	401	0.4702347	0.4634397	614	0.2040068	0.2010593	299
23	0.8797021	0.8837682	392	0.4566112	0.4497496	625	0.1980971	0.1951207	302
24	0.8877706	0.8917093	383	0.4428556	0.4359295	636	0.1921300	0.1891256	305
25	0.8955835	0.8993933	373	0.4289720	0.4219835	647	0.1861073	0.1830757	309
26	–0.9031381	–0.9068177	+363	+0.4149645	+0.4079156	+657	+0.1800307	+0.1769729	+312
27	0.9104318	0.9139800	353	0.4008373	0.3937301	668	0.1739021	0.1708189	315
28	0.9174622	0.9208781	343	0.3865946	0.3794313	678	0.1677232	0.1646156	318
29	0.9242273	0.9275098	332	0.3722407	0.3650235	688	0.1614959	0.1583648	321
30	0.9307250	0.9338730	321	0.3577800	0.3505111	697	0.1552221	0.1520685	324
31	–0.9369534	–0.9399659	+310	+0.3432170	+0.3358986	+707	+0.1489038	+0.1457286	+327
Sept. 1	0.9429104	0.9457866	299	0.3285562	0.3211905	716	0.1425428	0.1393471	330
2	0.9485943	0.9513335	287	0.3138020	0.3063912	725	0.1361413	0.1329260	333
3	0.9540038	0.9566053	275	0.2989588	0.2915050	734	0.1297011	0.1264670	336
4	0.9591376	0.9616007	263	0.2840306	0.2765360	743	0.1232239	0.1199721	339
5	–0.9639944	–0.9663185	+251	+0.2690217	+0.2614884	+751	+0.1167117	+0.1134431	+341
6	0.9685728	0.9707573	238	0.2539364	0.2463664	759	0.1101664	0.1068820	344
7	0.9728717	0.9749160	225	0.2387789	0.2311744	767	0.1035899	0.1002906	346
8	0.9768899	0.9787934	212	0.2235535	0.2159166	775	0.0969840	0.0936706	349
9	0.9806262	0.9823882	199	0.2082642	0.2005968	782	0.0903504	0.0870239	351
10	–0.9840793	–0.9856994	+185	+0.1929148	+0.1852189	+789	+0.0836910	+0.0803522	+354
11	0.9872482	0.9887259	171	0.1775094	0.1697870	796	0.0770075	0.0736573	356
12	0.9901319	0.9914667	157	0.1620521	0.1543054	803	0.0703016	0.0669409	358
13	0.9927296	0.9939206	143	0.1465472	0.1387783	810	0.0635752	0.0602049	360
14	0.9950395	0.9960863	129	0.1309989	0.1232098	816	0.0568300	0.0534510	362
15	–0.9970606	–0.9979626	+114	+0.1154114	+0.1076042	+822	+0.0500678	+0.0466811	+364
16	0.9987919	0.9995486	99	0.0997888	0.0919657	828	0.0432906	0.0398971	366
17	1.0002324	1.0008432	84	0.0841356	0.0762989	834	0.0365003	0.0331009	368
18	1.0013809	1.0018453	69	0.0684564	0.0606085	839	0.0296988	0.0262945	370
19	1.0022363	1.0025539	53	0.0527558	0.0448990	844	0.0228879	0.0194797	371
20	–1.0027979	–1.0029682	+ 38	+0.0370385	+0.0291752	+849	+0.0160696	+0.0126586	+373
21	1.0030649	1.0030877	22	0.0213094	+0.0134419	854	0.0092461	+0.0058332	374
22	1.0030367	1.0029118	+ 6	+0.0055732	–0.0022962	859	+0.0024195	–0.0009944	376
23	1.0027130	1.0024403	– 10	–0.0101656	0.0180345	863	–0.0044084	0.0078222	377
24	1.0020935	1.0016728	26	0.0259022	0.0337680	867	0.0112355	0.0146480	378
25	–1.0011780	–1.0006093	– 43	–0.0416313	–0.0494913	+870	–0.0180594	–0.0214695	+379
26	0.9999665	0.9992500	59	0.0573475	0.0651993	873	0.0248779	0.0282845	380
27	0.9984594	0.9975952	76	0.0730459	0.0808872	876	0.0316889	0.0350909	380
28	0.9966570	0.9956453	93	0.0887220	0.0965502	879	0.0384903	0.0418867	381
29	0.9945598	0.9934009	110	0.1043709	0.1121836	881	0.0452801	0.0486699	381
30	–0.9921684	–0.9908626	–127	–0.1199876	–0.1277824	+883	–0.0520560	–0.0554381	+382

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Oct. 1	−0.9894836	−0.9880313	−144	−0.1355673	−0.1433419	+885	−0.0588159	−0.0621892	+382
2	0.9865062	0.9849081	161	0.1511054	0.1588575	887	0.0655577	0.0689212	382
3	0.9832374	0.9814941	179	0.1665975	0.1743249	888	0.0722794	0.0756328	382
4	0.9796785	0.9777905	196	0.1820390	0.1897395	890	0.0789792	0.0823203	382
5	0.9758305	0.9737984	214	0.1974255	0.2050967	891	0.0856551	0.0889835	382
6	−0.9716944	−0.9695187	−231	−0.2127525	−0.2203922	+892	−0.0923051	−0.0956198	+382
7	0.9672713	0.9649525	249	0.2280155	0.2356218	892	0.0989273	0.1022273	381
8	0.9625624	0.9601012	267	0.2432105	0.2507814	892	0.1055197	0.1088042	381
9	0.9575690	0.9549660	285	0.2583335	0.2658667	891	0.1120806	0.1153487	380
10	0.9522923	0.9495481	303	0.2733801	0.2808735	891	0.1186082	0.1218590	380
11	−0.9467334	−0.9438486	−321	−0.2883460	−0.2957974	+890	−0.1251007	−0.1283332	+379
12	0.9408936	0.9378687	339	0.3032269	0.3106342	889	0.1315562	0.1347695	378
13	0.9347740	0.9316096	357	0.3180186	0.3253797	887	0.1379729	0.1411661	377
14	0.9283758	0.9250726	375	0.3327169	0.3400296	886	0.1443490	0.1475212	376
15	0.9217003	0.9182590	394	0.3473171	0.3545791	884	0.1506825	0.1538327	374
16	−0.9147489	−0.9111702	−412	−0.3618148	−0.3690239	+882	−0.1569716	−0.1600989	+373
17	0.9075231	0.9038079	431	0.3762057	0.3833597	880	0.1632144	0.1663178	371
18	0.9000246	0.8961736	450	0.3904853	0.3975819	877	0.1694089	0.1724875	369
19	0.8922550	0.8882692	469	0.4046489	0.4116858	874	0.1755532	0.1786060	367
20	0.8842162	0.8800966	488	0.4186919	0.4256668	871	0.1816453	0.1846712	366
21	−0.8759104	−0.8716580	−506	−0.4326096	−0.4395201	+867	−0.1876832	−0.1906812	+363
22	0.8673396	0.8629556	525	0.4463974	0.4532412	863	0.1936650	0.1966341	361
23	0.8585062	0.8539919	544	0.4600508	0.4668256	859	0.1995885	0.2025278	358
24	0.8494128	0.8447695	563	0.4735650	0.4802686	855	0.2054517	0.2083602	355
25	0.8400621	0.8352911	582	0.4869355	0.4935656	851	0.2112528	0.2141295	352
26	−0.8304568	−0.8255596	−601	−0.5001580	−0.5067125	+846	−0.2169899	−0.2198338	+349
27	0.8205999	0.8155782	620	0.5132283	0.5197050	841	0.2226610	0.2254712	346
28	0.8104948	0.8053501	639	0.5261420	0.5325388	836	0.2282642	0.2310398	343
29	0.8001446	0.7948785	658	0.5388950	0.5452100	830	0.2337977	0.2365378	339
30	0.7895525	0.7841667	677	0.5514835	0.5577149	824	0.2392598	0.2419635	336
31	−0.7787217	−0.7732180	−696	−0.5639037	−0.5700496	+817	−0.2446488	−0.2473153	+332
Nov. 1	0.7676559	0.7620360	715	0.5761520	0.5822105	810	0.2499631	0.2525916	328
2	0.7563586	0.7506243	734	0.5882246	0.5941938	803	0.2552010	0.2577909	324
3	0.7448333	0.7389863	753	0.6001178	0.6059961	796	0.2603611	0.2629115	320
4	0.7330834	0.7271253	771	0.6118284	0.6176142	788	0.2654418	0.2679519	316
5	−0.7211121	−0.7150446	−790	−0.6233531	−0.6290447	+780	−0.2704416	−0.2729108	+312
6	0.7089229	0.7027479	809	0.6346886	0.6402843	772	0.2753592	0.2777867	307
7	0.6965195	0.6902386	828	0.6458315	0.6513297	763	0.2801932	0.2825783	303
8	0.6839052	0.6775201	847	0.6567785	0.6621776	754	0.2849420	0.2872841	298
9	0.6710833	0.6645957	866	0.6675264	0.6728248	745	0.2896043	0.2919027	293
10	−0.6580573	−0.6514690	−885	−0.6780722	−0.6832683	+735	−0.2941789	−0.2964328	+288
11	0.6448308	0.6381436	904	0.6884126	0.6935046	725	0.2986642	0.3008730	283
12	0.6314074	0.6246231	922	0.6985440	0.7035303	714	0.3030589	0.3052219	277
13	0.6177908	0.6109112	941	0.7084632	0.7133422	703	0.3073616	0.3094780	272
14	0.6039845	0.5970114	959	0.7181669	0.7229370	692	0.3115708	0.3136309	266
15	−0.5899921	−0.5829274	−978	−0.7276518	−0.7323114	+681	−0.3156852	−0.3177064	+260

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Nov. 16	−0.5758176	−0.5686633	− 996	−0.7369149	−0.7414621	+669	−0.3197034	−0.3216760	+254
17	0.5614651	0.5542233	1014	0.7459525	0.7503858	657	0.3236241	0.3255474	248
18	0.5469387	0.5396116	1032	0.7547614	0.7590793	644	0.3274457	0.3293190	241
19	0.5322427	0.5248325	1050	0.7633387	0.7675395	631	0.3311669	0.3329895	234
20	0.5173814	0.5098904	1068	0.7716812	0.7757635	618	0.3347864	0.3365577	228
21	−0.5023597	−0.4947903	−1086	−0.7797859	−0.7837482	+604	−0.3383029	−0.3400222	+221
22	0.4871826	0.4795372	1104	0.7876499	0.7914907	590	0.3417152	0.3433818	214
23	0.4718548	0.4641358	1122	0.7952703	0.7989882	576	0.3450218	0.3466351	207
24	0.4563810	0.4485909	1139	0.8026443	0.8062382	561	0.3482215	0.3497810	200
25	0.4407662	0.4329078	1156	0.8097695	0.8132382	546	0.3513133	0.3528185	193
26	−0.4250160	−0.4170917	−1172	−0.8166438	−0.8199861	+530	−0.3542963	−0.3557467	+186
27	0.4091356	0.4011478	1189	0.8232650	0.8264799	514	0.3571695	0.3585646	179
28	0.3931295	0.3850811	1205	0.8296309	0.8327175	497	0.3599319	0.3612713	171
29	0.3770031	0.3688966	1221	0.8357396	0.8386971	480	0.3625826	0.3638659	163
30	0.3607616	0.3525996	1237	0.8415897	0.8444172	463	0.3651209	0.3663477	155
Dec. 1	−0.3444104	−0.3361953	−1253	−0.8471795	−0.8498762	+446	−0.3675460	−0.3687160	+147
2	0.3279545	0.3196888	1269	0.8525072	0.8550724	428	0.3698574	0.3709702	139
3	0.3113986	0.3030848	1284	0.8575715	0.8600045	410	0.3720544	0.3731098	131
4	0.2947477	0.2863884	1299	0.8623711	0.8646712	391	0.3741364	0.3751341	122
5	0.2780072	0.2696049	1314	0.8669047	0.8690713	372	0.3761028	0.3770425	114
6	−0.2611820	−0.2527391	−1328	−0.8711710	−0.8732036	+353	−0.3779531	−0.3788346	+105
7	0.2442767	0.2357955	1342	0.8751688	0.8770668	333	0.3796868	0.3805098	96
8	0.2272961	0.2187790	1355	0.8788969	0.8806595	313	0.3813035	0.3820678	87
9	0.2102450	0.2016946	1369	0.8823540	0.8839806	293	0.3828027	0.3835081	78
10	0.1931284	0.1845472	1382	0.8855390	0.8870291	272	0.3841838	0.3848300	69
11	−0.1759514	−0 1673418	−1395	−0.8884508	−0.8898039	+251	−0.3854464	−0.3860331	+ 60
12	0.1587188	0.1500832	1408	0.8910882	0.8923036	229	0.3865900	0.3871170	50
13	0.1414355	0.1327765	1420	0.8934497	0.8945268	207	0.3876141	0.3880811	41
14	0.1241068	0.1154271	1432	0.8955343	0.8964725	185	0.3885182	0.3889251	31
15	0.1067380	0.0980403	1443	0.8973410	0.8981399	163	0.3893020	0.3896486	22
16	−0.0893344	−0.0806214	−1454	−0.8988690	−0.8995283	+140	−0.3899651	−0.3902512	+ 12
17	0.0719015	0.0631759	1465	0.9001175	0.9006367	117	0.3905070	0.3907324	+ 2
18	0.0544448	0.0457094	1475	0.9010857	0.9014644	93	0.3909273	0.3910918	− 8
19	0.0369700	0.0282276	1485	0.9017727	0 9020106	69	0.3912257	0.3913292	18
20	0.0194827	−0.0107363	1494	0.9021780	0.9022749	44	0.3914021	0.3914445	28
21	−0.0019886	+0.0067590	−1503	−0.9023013	−0.9022572	+ 20	−0.3914563	−0.3914376	− 38
22	+0.0155065	0.0242527	1511	0.9021426	0.9019574	− 5	0.3913882	0.3913082	48
23	0.0329970	0.0417387	1519	0.9017018	0.9013756	30	0.3911976	0.3910564	58
24	0.0504769	0.0592111	1526	0.9009789	0.9005118	56	0.3908846	0.3906823	69
25	0.0679402	0.0766640	1533	0.8999743	0.8993666	81	0.3904494	0.3901861	79
26	+0.0853813	+0.0940916	−1539	−0.8986887	−0.8979408	−107	−0.3898922	−0.3895679	− 90
27	0.1027942	0.1114884	1545	0.8971227	0.8962348	133	0.3892131	0.3888280	101
28	0.1201735	0.1288489	1550	0.8952768	0.8942492	160	0.3884125	0.3879668	112
29	0.1375140	0.1461679	1555	0.8931518	0.8919850	186	0.3874908	0.3869847	123
30	0.1548102	0.1634399	1560	0.8907489	0.8894436	213	0.3864483	0.3858820	134
31	+0.1720565	+0.1806594	−1564	−0.8880693	−0.8866261	−240	−0.3852855	−0.3846593	−145
32	+0.1892477	+0.1978213	−1567	−0.8851142	−0.8835336	−267	−0.3840031	−0.3833172	−156

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	JANUARY.		Day of Month.	FEBRUARY.		Day of Month.	MARCH.	
	True Longitude.	Latitude.		True Longitude.	Latitude.		True Longitude.	Latitude.
1.0	276° 2′ 17″.8	+1° 23′ 11″.3	1.0	327° 32′ 42″.3	−3° 7′ 9″.0	1.0	335° 52′ 59″.3	−3° 39′ 55″.9
1.5	283 30 17.0	0 42 36.6	1.5	334 28 46.1	3 36 21.7	1.5	342 40 34.1	4 3 38.9
2.0	290 55 6.2	+0 1 34.6	2.0	341 19 30.3	4 2 3.2	2.0	349 24 17.2	4 23 42.4
2.5	298 15 48.7	−0 39 7.1	2.5	348 4 39.0	4 23 58.7	2.5	356 3 49.6	4 39 55.8
3.0	305 31 35.5	1 18 43.7	3.0	354 44 3.6	4 41 58.9	3.0	2 38 56.7	4 52 12.6
3.5	312 41 46.7	−1 56 35.1	3.5	1 17 42.8	−4 55 59.3	3.5	9 9 28.9	−5 0 31.4
4.0	319 45 52.3	2 32 6.4	4.0	7 45 42.4	5 5 59.5	4.0	15 35 22.0	5 4 53.9
4.5	326 43 32.0	3 4 48.8	4.5	14 8 15.1	5 12 2.5	4.5	21 56 37.2	5 5 25.3
5.0	333 34 35.3	3 34 19.6	5.0	20 25 39.0	5 14 13.9	5.0	28 13 21.8	5 2 13.7
5.5	340 19 0.9	4 0 21.8	5.5	26 38 17.5	5 12 41.3	5.5	34 25 48.3	4 55 29.0
6.0	346 56 55.7	−4 22 43.9	6.0	32 46 38.3	−5 7 33.9	6.0	40 34 14.8	−4 45 22.6
6.5	353 28 33.7	4 41 18.8	6.5	38 51 12.6	4 59 1.6	6.5	46 39 4.1	4 32 7.0
7.0	359 54 14.9	4 56 3.3	7.0	44 52 34.4	4 47 15.1	7.0	52 40 43.1	4 15 55.4
7.5	6 14 24.3	5 6 57.3	7.5	50 51 19.6	4 32 25.8	7.5	58 39 42.8	3 57 1.3
8.0	12 29 30.6	5 14 3.0	8.0	56 48 5.2	4 14 45.1	8.0	64 36 37.2	3 35 38.6
8.5	18 40 5.2	−5 17 24.7	8.5	62 43 29.3	−3 54 24.8	8.5	70 32 2.8	−3 12 1.1
9.0	24 46 41.4	5 17 8.0	9.0	68 38 9.9	3 31 37.0	9.0	76 26 38.1	2 46 23.0
9.5	30 49 53.7	5 13 19.3	9.5	74 32 44.3	3 6 34.4	9.5	82 21 3.1	2 18 58.3
10.0	36 50 16.7	5 6 6.2	10.0	80 27 49.7	2 39 30.3	10.0	88 15 58.4	1 50 1.7
10.5	42 48 24.9	4 55 36.9	10.5	86 24 1.0	2 10 38.6	10.5	94 12 4.8	1 19 48.4
11.0	48 44 52.3	−4 41 59.9	11.0	92 21 51.9	−1 40 14.5	11.0	100 10 2.6	−0 48 34.0
11.5	54 40 11.6	4 25 24.9	11.5	98 21 53.7	1 8 34.1	11.5	106 10 31.2	−0 16 35.3
12.0	60 34 54.2	4 6 1.9	12.0	104 24 34.6	0 35 55.1	12.0	112 14 8.2	+0 15 49.8
12.5	66 29 29.5	3 44 1.8	12.5	110 30 20.1	−0 2 36.7	12.5	118 21 28.8	0 48 21.8
13.0	72 24 25.2	3 19 36.7	13.0	116 39 32.0	+0 31 0.2	13.0	124 33 4.5	1 20 40.0
13.5	78 20 7.0	−2 52 59.6	13.5	122 52 28.3	+1 4 33.2	13.5	130 49 22.9	+1 52 21.8
14.0	84 16 58.0	2 24 24.9	14.0	129 9 22.9	1 37 38.3	14.0	137 10 46.8	2 23 3.1
14.5	90 15 19.4	1 54 8.1	14.5	135 30 25.1	2 9 50.1	14.5	143 37 32.9	2 52 18.2
15.0	96 15 30.1	1 22 26.4	15.0	141 55 39.8	2 40 42.2	15.0	150 9 51.4	3 19 40.4
15.5	102 17 46.7	0 49 38.5	15.5	148 25 7.5	3 9 47.8	15.5	156 47 45.1	3 44 42.2
16.0	108 22 23.7	−0 16 4.3	16.0	154 58 43.8	+3 36 39.7	16.0	163 31 9.2	+4 6 56.2
16.5	114 29 33.6	+0 17 54.6	16.5	161 36 20.5	4 0 51.6	16.5	170 19 51.2	4 25 55.8
17.0	120 39 27.3	0 51 55.5	17.0	168 17 45.8	4 21 58.3	17.0	177 13 30.5	4 41 16.2
17.5	126 52 13.4	1 25 34.6	17.5	175 2 44.3	4 39 36.5	17.5	184 11 39.4	4 52 35.3
18.0	133 7 59.5	1 58 27.4	18.0	181 50 58.4	4 53 25.8	18.0	191 13 44.1	4 59 34.9
18.5	139 26 51.8	+2 30 8.9	18.5	188 42 8.7	+5 3 8.8	18.5	198 19 5.7	+5 2 1.6
19.0	145 48 55.7	3 0 13.7	19.0	195 35 55.2	5 8 32.2	19.0	205 27 2.2	4 59 47.5
19.5	152 14 15.5	3 28 16.7	19.5	202 31 57.8	5 9 26.8	19.5	212 36 49.8	4 52 50.5
20.0	158 42 55.3	3 53 53.7	20.0	209 29 56.7	5 5 47.7	20.0	219 47 45.2	4 41 14.9
20.5	165 14 58.5	4 16 41.0	20.5	216 29 33.6	4 57 35.1	20.5	226 59 7.3	4 25 11.1
21.0	171 50 28.2	+4 36 16.6	21.0	223 30 31.6	+4 44 53.7	21.0	234 10 18.5	+4 4 55.0
21.5	178 29 27.3	4 52 20.0	21.5	230 32 35.8	4 27 52.8	21.5	241 20 45.9	3 40 47.9
22.0	185 11 58.3	5 4 32.9	22.0	237 35 33.1	4 6 46.4	22.0	248 30 2.0	3 13 15.3
22.5	191 58 3.0	5 12 39.2	22.5	244 39 11.6	3 41 52.6	22.5	255 37 45.3	2 42 46.3
23.0	198 47 42.3	5 16 25.8	23.0	251 43 20.5	3 13 33.8	23.0	262 43 39.6	2 9 52.3
23.5	205 40 55.9	+5 15 42.9	23.5	258 47 50.0	+2 42 15.8	23.5	269 47 33.9	+1 35 6.8
24.0	212 37 41.6	5 10 24.1	24.0	265 52 30.0	2 8 27.8	24.0	276 49 21.3	0 59 4.2
24.5	219 37 54.9	5 0 27.0	24.5	272 57 9.5	1 32 42.0	24.5	283 48 58.2	+0 22 19.3
25.0	226 41 28.6	4 45 54.0	25.0	280 1 36.3	0 55 32.7	25.0	290 46 23.3	−0 14 33.6
25.5	233 48 11.7	4 26 52.2	25.5	287 5 36.1	+0 17 36.0	25.5	297 41 36.7	0 51 0.9
26.0	240 57 49.5	+4 3 33.9	26.0	294 8 52.4	−0 20 31.2	26.0	304 34 38.4	−1 26 30.2
26.5	248 10 2.5	3 36 16.8	26.5	301 11 6.1	0 58 11.6	26.5	311 25 27.7	2 0 31.2
27.0	255 24 26.5	3 5 24.4	27.0	308 11 55.6	1 34 48.9	27.0	318 14 2.9	2 32 35.4
27.5	262 40 32.4	2 31 25.5	27.5	315 10 57.3	2 9 48.5	27.5	325 0 20.4	3 2 16.8
28.0	269 57 46.4	1 54 53.9	28.0	322 7 45.7	2 42 38.0	28.0	331 44 14.7	3 29 12.4
28.5	277 15 30.2	1 16 27.7	28.5	329 1 55.0	3 12 48.8	28.5	338 25 38.5	3 53 2.5
29.0	284 33 2.1	+0 36 48.3	29.0	335 52 59.3	−3 39 55.9	29.0	345 4 22.9	−4 13 30.6
29.5	291 49 37.9	−0 3 21.0	29.5	342 40 34.1	4 3 38.9	29.5	351 40 17.8	4 30 24.1
30.0	299 4 32.1	0 43 16.3	30.0	349 24 17.2	4 23 42.4	30.0	358 13 12.7	4 43 33.9
30.5	306 16 59.3	1 22 14.9	30.5	356 3 49.6	4 39 55.8	30.5	4 42 57.4	4 52 54.8
31.0	313 26 16.2	1 59 36.7	31.0	2 38 56.7	4 52 12.6	31.0	11 9 22.9	4 58 25.1
31.5	320 31 42.3	−2 34 45.3	31.5	9 9 28.9	−5 0 31.4	31.5	17 32 21.8	−5 0 6.7

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	APRIL.		Day of Month.	MAY.		Day of Month.	JUNE.	
	True Longitude.	Latitude.		True Longitude.	Latitude.		True Longitude.	Latitude.
1.0	23° 51′ 49″.5	−4° 58′ 4″.3	1.0	57° 1′ 38″.0	−3° 42′ 11″.2	1.0	101° 14′ 52″.4	−0° 5′ 36″.5
1.5	30 7 44.6	4 52 25.6	1.5	63 0 54.1	3 19 19.0	1.5	107 8 56.4	+0 26 45.2
2.0	36 20 9.3	4 43 20.4	2.0	68 58 17.8	2 54 20.4	2.0	113 3 57.0	0 58 56.4
2.5	42 29 10.1	4 31 0.5	2.5	74 54 6.5	2 27 32.1	2.5	119 0 20.4	1 30 38.1
3.0	48 34 57.4	4 15 39.1	3.0	80 48 40.6	1 59 11.2	3.0	124 58 34.8	2 1 31.2
3.5	54 37 46.1	−3 57 30.3	3.5	86 42 23.7	−1 29 35.0	3.5	130 59 10.4	+2 31 16.8
4.0	60 37 55.3	3 36 49.3	4.0	92 35 42.2	0 59 0.7	4.0	137 2 38.9	2 59 35.6
4.5	66 35 48.1	3 13 51.3	4.5	98 29 5.7	−0 27 45.8	4.5	143 9 33.0	3 26 7.9
5.0	72 31 51.6	2 48 51.9	5.0	104 23 6.2	+0 3 52.2	5.0	149 20 25.7	3 50 33.9
5.5	78 26 36.4	2 22 6.9	5.5	110 18 18.3	0 35 35.9	5.5	155 35 50.3	4 12 33.6
6.0	84 20 36.0	−1 53 52.0	6.0	116 15 18.6	+1 7 7.3	6.0	161 56 19.3	+4 31 46.9
6.5	90 14 26.7	1 24 23.1	6.5	122 14 45.0	1 38 8.1	6.5	168 22 23.2	4 47 53.0
7.0	96 8 46.9	0 53 56.1	7.0	128 17 16.9	2 8 19.7	7.0	174 54 29.9	5 0 31.8
7.5	102 4 16.9	−0 22 47.2	7.5	134 23 33.9	2 37 22.6	7.5	181 33 3.3	5 9 23.6
8.0	108 1 37.9	+0 8 46.7	8.0	140 34 15.2	3 4 56.4	8.0	188 18 21.5	5 14 9.5
8.5	114 1 31.9	+0 40 28.2	8.5	146 49 58.8	+3 30 39.7	8.5	195 10 36.1	+5 14 32.6
9.0	120 4 40.4	1 11 59.2	9.0	153 11 20.4	3 54 10.4	9.0	202 9 50.5	5 10 18.9
9.5	126 11 43.9	1 43 0.2	9.5	159 38 52.0	4 15 5.5	9.5	209 15 58.4	5 1 18.2
10.0	132 23 21.3	2 13 10.3	10.0	166 13 0.9	4 33 1.2	10.0	216 28 43.0	4 47 25.3
10.5	138 40 8.3	2 42 7.6	10.5	172 54 7.8	4 47 33.7	10.5	223 47 36.4	4 28 41.2
11.0	145 2 36.6	+3 9 28.7	11.0	179 42 25.6	+4 58 19.8	11.0	231 11 59.4	+4 5 14.5
11.5	151 31 12.4	3 34 48.8	11.5	186 37 57.8	5 4 57.4	11.5	238 41 2.0	3 37 21.7
12.0	158 6 15.8	3 57 42.0	12.0	193 40 37.1	5 7 7.0	12.0	246 13 44.4	3 5 27.7
12.5	164 47 58.8	4 17 42.1	12.5	200 50 4.8	5 4 32.9	12.5	253 49 0.4	2 30 5.5
13.0	171 36 24.2	4 34 22.7	13.0	208 5 50.1	4 57 4.3	13.0	261 25 37.2	1 51 55.5
13.5	178 31 24.7	+4 47 18.5	13.5	215 27 10.4	+4 44 36.8	13.5	269 2 20.5	+1 11 43.7
14.0	185 32 42.5	4 56 6.8	14.0	222 53 12.3	4 27 13.6	14.0	276 37 56.6	+0 30 19.7
14.5	192 39 49.4	5 0 27.9	14.5	230 22 53.4	4 5 6.3	14.5	284 11 15.2	−0 11 25.5
15.0	199 52 6.6	5 0 6.8	15.0	237 55 4.5	3 38 34.7	15.0	291 41 11.9	0 52 41.4
15.5	207 8 46.3	4 54 54.3	15.5	245 28 32.7	3 8 6.9	15.5	299 6 50.5	1 32 40.6
16.0	214 28 53.2	+4 44 48.3	16.0	253 2 4.6	+2 34 18.3	16.0	306 27 24.1	−2 10 40.5
16.5	221 51 27.0	4 29 53.9	16.5	260 34 29.1	1 57 49.9	16.5	313 42 16.1	2 46 4.3
17.0	229 15 24.9	4 10 24.0	17.0	268 4 40.5	1 19 26.6	17.0	320 51 0.1	3 18 21.5
17.5	236 39 44.6	3 46 38.7	17.5	275 31 40.7	0 39 55.1	17.5	327 53 20.1	3 47 8.3
18.0	244 3 26.7	3 19 4.7	18.0	282 54 40.8	+0 0 1.9	18.0	334 49 9.3	4 12 7.3
18.5	251 25 36.9	+2 48 14.4	18.5	290 13 1.6	−0 39 28.3	18.5	341 38 29.0	−4 33 7.0
19.0	258 45 28.2	2 14 43.9	19.0	297 26 14.5	1 17 54.2	19.0	348 21 27.9	4 50 0.9
19.5	266 2 21.8	1 39 12.0	19.5	304 34 0.6	1 54 38.9	19.5	354 58 20.4	5 2 46.7
20.0	273 15 47.5	1 2 18.7	20.0	311 36 9.7	2 29 10.3	20.0	1 29 25.3	5 11 25.7
20.5	280 25 23.9	+0 24 43.6	20.5	318 32 39.8	3 1 1.4	20.5	7 55 5.1	5 16 2.0
21.0	287 30 57.3	−0 12 54.8	21.0	325 23 35.2	−3 29 50.1	21.0	14 15 44.6	−5 16 42.1
21.5	294 32 21.2	0 50 0.4	21.5	332 9 5.5	3 55 19.2	21.5	20 31 50.3	5 13 34.3
22.0	301 29 34.8	1 25 59.6	22.0	338 49 24.0	4 17 15.5	22.0	26 43 49.4	5 6 48.2
22.5	308 22 41.9	2 0 21.8	22.5	345 24 47.0	4 35 29.9	22.5	32 52 8.9	4 56 34.4
23.0	315 11 49.6	2 32 40.0	23.0	351 55 32.3	4 49 56.5	23.0	38 57 15.9	4 43 4.7
23.5	321 57 6.8	−3 2 30.3	23.5	358 21 58.6	−5 0 32.6	23.5	44 59 36.8	−4 26 31.7
24.0	328 38 43.4	3 29 32.2	24.0	4 44 24.8	5 7 17.8	24.0	50 59 36.6	4 7 8.8
24.5	335 16 49.6	3 53 28.3	24.5	11 3 9.4	5 10 14.3	24.5	56 57 39.5	3 45 10.0
25.0	341 51 34.8	4 14 4.6	25.0	17 18 30.3	5 9 26.2	25.0	62 54 7.9	3 20 50.2
25.5	348 23 7.8	4 31 10.3	25.5	23 30 44.5	5 4 59.6	25.5	68 49 23.5	2 54 25.0
26.0	354 51 35.5	−4 44 37.3	26.0	29 40 7.6	−4 57 2.4	26.0	74 43 46.8	−2 26 10.9
26.5	1 17 3.6	4 54 20.6	26.5	35 46 54.7	4 45 44.0	26.5	80 37 36.9	1 56 25.0
27.0	7 39 36.6	5 0 18.2	27.0	41 51 19.9	4 31 15.1	27.0	86 31 12.2	1 25 25.0
27.5	13 59 18.1	5 2 30.7	27.5	47 53 36.3	4 13 48.1	27.5	92 24 50.4	0 53 29.4
28.0	20 16 10.8	5 1 1.3	28.0	53 53 56.9	3 53 36.5	28.0	98 18 48.8	−0 20 56.9
28.5	26 30 17.4	4 55 55.7	28.5	59 52 34.4	−3 30 55.1	28.5	104 13 24.3	+0 11 52.9
29.0	32 41 40.6	−4 47 21.9	29.0	65 49 42.0	3 5 59.5	29.0	110 8 54.1	+0 44 40.3
29.5	38 50 24.2	4 35 30.0	29.5	71 45 33.1	2 39 6.4	29.5	116 5 35.4	1 17 5.2
30.0	44 56 33.4	4 20 31.8	30.0	77 40 22.1	2 10 32.9	30.0	122 3 45.8	1 48 47.6
30.5	51 0 15.0	4 2 40.7	30.5	83 34 24.8	1 40 36.8	30.5	128 3 43.7	2 19 27.4
31.0	57 1 38.0	3 42 11.2	31.0	89 27 58.0	1 9 36.3	31.0	134 5 48.2	2 48 44.4
31.5	63 0 54.1	−3 19 19.0	31.5	95 21 20.4	−0 37 50.0	31.5	140 10 19.2	+3 16 18.8

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	JULY.		Day of Month.	AUGUST.		Day of Month.	SEPTEMBER.	
	True Longitude.	Latitude.		True Longitude.	Latitude.		True Longitude.	Latitude.
1.0	134° 5′ 48″.2	+2° 48′ 44″.4	1.0	181° 18′ 4″.0	+5° 8′ 13″.1	1.0	232° 7′ 16″.7	+3° 47′ 50″.8
1.5	140 10 19.2	3 16 18.8	1.5	187 49 38.0	5 12 41.1	1.5	239 3 48.3	3 21 30.1
2.0	146 17 37.6	3 41 50.9	2.0	194 25 2.3	5 13 5.4	2.0	246 2 39.2	2 52 0.1
2.5	152 28 5.1	4 5 1.5	2.5	201 4 25.0	5 9 18.5	2.5	253 3 45.5	2 19 44.8
3.0	158 42 4.1	4 25 31.8	3.0	207 47 53.5	5 1 15.7	3.0	260 7 2.5	1 45 11.5
3.5	164 59 57.2	+4 43 3.2	3.5	214 35 34.4	+4 48 55.9	3.5	267 12 23.9	+1 8 51.1
4.0	171 22 7.2	4 57 18.2	4.0	221 27 32.5	4 32 21.3	4.0	274 19 40.6	+0 31 17.4
4.5	177 48 56.4	5 8 0.0	4.5	228 23 50.2	4 11 38.2	4.5	281 28 40.4	−0 6 53.6
5.0	184 20 46.1	5 14 52.7	5.0	235 24 26.9	3 46 57.4	5.0	288 39 6.7	0 45 4.1
5.5	190 57 55.3	5 17 42.0	5.5	242 29 18.1	3 18 34.5	5.5	295 50 38.2	1 22 35.1
6.0	197 40 40.4	+5 16 15.7	6.0	249 38 14.5	+2 46 50.1	6.0	303 2 48.8	−1 58 47.8
6.5	204 29 14.1	5 10 23.8	6.5	256 51 1.2	2 12 10.3	6.5	310 15 7.4	2 33 4.7
7.0	211 23 44.2	4 59 59.6	7.0	264 7 17.1	1 35 6.4	7.0	317 26 58.3	3 4 50.1
7.5	218 24 12.5	4 45 0.3	7.5	271 26 34.2	0 56 14.5	7.5	324 37 42.4	3 33 32.0
8.0	225 30 34.0	4 25 28.0	8.0	278 48 17.9	+0 16 15.0	8.0	331 46 38.2	3 58 42.7
8.5	232 42 35.3	+4 1 30.5	8.5	286 11 46.9	−0 24 8.7	8.5	338 53 3.5	−4 19 59.9
9.0	239 59 54.7	3 33 22.0	9.0	293 36 13.8	1 4 11.2	9.0	345 56 16.8	4 37 6.9
9.5	247 22 1.2	3 1 23.7	9.5	301 0 46.4	1 43 6.7	9.5	352 55 39.4	4 49 53.2
10.0	254 48 14.5	2 26 3.9	10.0	308 24 29.5	2 20 11.3	10.0	359 50 36.7	4 58 14.3
10.5	262 17 45.9	1 47 58.0	10.5	315 46 26.2	2 54 44.1	10.5	6 40 39.9	5 2 11.4
11.0	269 49 39.3	+1 7 47.5	11.0	323 5 40.5	−3 26 8.8	11.0	13 25 26.8	−5 1 50.6
11.5	277 22 52.3	+0 26 18.8	11.5	330 21 19.2	3 53 55.3	11.5	20 4 42.6	4 57 22.3
12.0	284 56 18.7	−0 15 38.5	12.0	337 32 33.7	4 17 40.1	12.0	26 38 20.3	4 49 0.4
12.5	292 28 50.6	0 57 13.8	12.5	344 38 42.3	4 37 6.8	12.5	33 6 20.8	4 37 1.1
13.0	299 59 21.1	1 37 37.3	13.0	351 39 11.3	4 52 6.1	13.0	39 28 52.4	4 21 42.5
13.5	307 26 46.1	−2 16 2.8	13.5	358 33 35.5	−5 2 34.9	13.5	45 46 10.2	−4 3 23.7
14.0	314 50 7.6	2 51 49.1	14.0	5 21 39.3	5 8 35.6	14.0	51 58 35.5	3 42 24.1
14.5	322 8 34.5	3 24 20.9	14.5	12 3 16.2	5 10 15.8	14.5	58 6 35.0	3 19 3.3
15.0	329 21 24.9	3 53 10.4	15.0	18 38 28.6	5 7 46.3	15.0	64 10 39.7	2 53 40.3
15.5	336 28 6.4	4 17 57.1	15.5	25 7 26.7	5 1 20.9	15.5	70 11 24.4	2 26 33.8
16.0	343 28 16.7	−4 38 27.5	16.0	31 30 28.2	−4 51 15.1	16.0	76 9 26.8	−1 58 1.9
16.5	350 21 43.6	4 54 34.5	16.5	37 47 56.6	4 37 45.5	16.5	82 5 26.2	1 28 22.2
17.0	357 8 23.9	5 6 16.9	17.0	44 0 20.5	4 21 9.6	17.0	88 0 3.6	0 57 51.9
17.5	3 48 23.3	5 13 37.8	17.5	50 8 12.3	4 1 44.7	17.5	93 54 0.5	−0 26 48.0
18.0	10 21 54.5	5 16 44.2	18.0	56 12 7.4	3 39 48.2	18.0	99 47 58.3	+0 4 32.8
18.5	16 49 16.8	−5 15 45.8	18.5	62 12 43.3	−3 15 37.3	18.5	105 42 38.1	+0 35 53.3
19.0	23 10 54.5	5 10 54.4	19.0	68 10 38.5	2 49 28.9	19.0	111 38 39.4	1 6 56.3
19.5	29 27 15.4	5 2 23.2	19.5	74 6 32.1	2 21 39.6	19.5	117 36 39.9	1 37 24.0
20.0	35 38 50.7	4 50 26.0	20.0	80 1 3.0	1 52 26.1	20.0	123 37 15.0	2 6 57.8
20.5	41 46 13.3	4 35 17.6	20.5	85 54 49.4	1 22 4.9	20.5	129 40 56.9	2 35 18.8
21.0	47 49 57.1	−4 17 12.8	21.0	91 48 28.2	−0 50 52.8	21.0	135 48 14.1	+3 2 7.1
21.5	53 50 36.2	3 56 26.7	21.5	97 42 34.4	−0 19 7.2	21.5	141 59 30.8	3 27 2.2
22.0	59 48 44.7	3 33 14.6	22.0	103 37 41.3	+0 12 54.4	22.0	148 15 6.4	3 49 43.3
22.5	65 44 56.0	3 7 52.2	22.5	109 34 19.3	0 44 53.7	22.5	154 35 14.6	4 9 49.6
23.0	71 39 42.4	2 40 35.4	23.0	115 32 56.1	1 16 31.6	23.0	161 0 3.5	4 27 0.3
23.5	77 33 34.5	−2 11 40.4	23.5	121 33 56.4	+1 47 28.4	23.5	167 29 35.3	+4 40 55.8
24.0	83 27 1.3	1 41 23.7	24.0	127 37 41.4	2 17 23.8	24.0	174 3 46.0	+4 51 17.9
24.5	89 20 29.8	1 10 2.8	24.5	133 44 28.5	2 45 56.9	24.5	180 42 25.7	4 57 50.5
25.0	95 14 25.4	0 37 55.5	25.0	139 54 31.7	3 12 46.4	25.0	187 25 19.3	5 0 20.6
25.5	101 9 11.1	−0 5 20.4	25.5	146 8 1.3	3 37 30.9	25.5	194 12 6.7	4 58 38.6
26.0	107 5 7.9	+0 27 23.4	26.0	152 25 3.8	+3 59 49.4	26.0	201 2 24.3	+4 52 39.1
26.5	113 2 34.8	0 59 56.0	26.5	158 45 42.1	4 19 21.7	26.5	207 55 45.8	4 42 21.6
27.0	119 1 48.9	1 31 57.0	27.0	165 9 56.1	4 35 48.2	27.0	214 51 43.6	4 27 50.3
27.5	125 3 5.6	2 3 5.8	27.5	171 37 42.8	4 48 51.6	27.5	221 49 49.9	4 9 14.4
28.0	131 6 38.6	2 33 1.4	28.0	178 8 56.8	4 58 16.3	28.0	228 49 38.2	3 46 48.3
28.5	137 12 40.1	3 1 22.7	28.5	184 43 31.0	5 3 49.3	28.5	235 50 43.9	3 20 50.8
29.0	143 21 21.2	+3 27 48.9	29.0	191 21 17.0	+5 5 20.5	29.0	242 52 45.3	+2 51 44.9
29.5	149 32 51.9	3 51 59.7	29.5	198 2 6.1	5 2 43.1	29.5	249 55 24.0	2 19 57 5
30.0	155 47 21.6	4 13 35.4	30.0	204 45 49.6	4 55 54.1	30.0	256 58 25.1	1 45 58.2
30.5	162 4 59.1	4 32 17.3	30.5	211 32 19.1	4 44 53.9	30.5	264 1 36.8	1 10 19.2
31.0	168 25 53.0	4 47 47.9	31.0	218 21 27.4	4 29 46.9	31.0	271 4 50.2	+0 33 34.3
31.5	174 50 11.8	+4 59 51.2	31.5	225 13 8.3	+4 10 41.8	31.5	278 7 58.3	−0 3 41.7

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	OCTOBER.		Day of Month.	NOVEMBER.		Day of Month.	DECEMBER.	
	True Longitude.	Latitude.		True Longitude.	Latitude.		True Longitude.	Latitude.
1.0	271° 4′ 50″.2	+0° 33′ 34″.3	1.0	324° 2′ 47″.7	—3° 53′ 2″.9	1.0	1° 33′ 10″.1	—5° 14′ 44″.7
1.5	278 7 58.3	—0 3 41.7	1.5	330 55 9.9	4 15 14.5	1.5	8 6 32.3	5 13 45.9
2.0	285 10 55.5	0 40 53.3	2.0	337 44 51.0	4 33 37.9	2.0	14 35 57.8	5 8 45.7
2.5	292 13 36.3	1 17 25.6	2.5	344 31 48.9	4 48 2.2	2.5	21 1 39.0	4 59 54.4
3.0	299 15 54.5	2 52 44.0	3.0	351 16 0.7	4 58 20.0	3.0	27 23 48.0	4 47 24.6
3.5	306 17 42.4	—2 26 15.6	3.5	357 57 22.4	—5 4 27.8	3.5	33 42 36.6	—4 31 30.4
4.0	313 18 50.1	2 57 29.3	4.0	4 35 49.3	5 6 25.8	4.0	39 58 16.5	4 12 27.7
4.5	320 19 4.9	3 25 56.5	4.5	11 11 15.5	5 4 17.7	4.5	46 10 58.5	3 50 33.7
5.0	327 18 10.8	3 51 11.9	5.0	17 43 34.9	4 58 10.5	5.0	52 20 53.3	3 26 6.9
5.5	334 15 48.9	4 12 53.8	5.5	24 12 41.4	4 48 14.5	5.5	58 28 11.6	2 59 26.4
6.0	341 11 37.8	—4 30 44.5	6.0	30 38 29.8	—4 34 42.6	6.0	64 33 4.1	—2 30 52.3
6.5	348 5 13.9	4 44 31.0	6.5	37 0 56.2	4 17 50.2	6.5	70 35 41.9	2 0 45.3
7.0	354 56 12.6	4 54 5.1	7.0	43 19 58.3	3 57 54.9	7.0	76 36 16.9	1 29 26.3
7.5	1 44 9.3	4 59 23.1	7.5	49 35 36.1	3 35 15.6	7.5	82 35 1.5	0 57 16.1
8.0	8 28 40.2	5 0 26.4	8.0	55 47 52.4	3 10 12.4	8.0	88 32 9.6	—0 24 35.4
8.5	15 9 23.7	—4 57 20.7	8.5	61 56 53.3	—2 43 6.3	8.5	94 27 56.6	+0 8 15.1
9.0	21 46 1.8	4 50 15.7	9.0	68 2 48.0	2 14 18.5	9.0	100 22 39.0	0 40 55.5
9.5	28 18 20.5	4 39 24.4	9.5	74 5 49.2	1 44 10.4	9.5	106 16 35.8	1 13 6.2
10.0	34 46 10.7	4 25 2.8	10.0	80 6 13.1	1 13 2.6	10.0	112 10 7.3	1 44 28.5
10.5	41 9 28.9	4 7 28.9	10.5	86 4 19.5	0 41 15.8	10.5	118 3 35.9	2 14 44.1
11.0	47 28 17.1	—3 47 2.3	11.0	92 0 31.3	—0 9 9.7	11.0	123 57 26.2	+2 43 36.0
11.5	53 42 43.1	3 24 3.5	11.5	97 55 14.8	+0 22 56.7	11.5	129 52 4.8	3 10 47.1
12.0	59 53 0.1	2 58 53.1	12.0	103 48 58.9	0 54 44.9	12.0	135 47 59.9	3 36 1.2
12.5	65 59 26.5	2 31 51.8	12.5	109 42 15.6	1 25 57.0	12.5	141 45 42.0	3 59 2.6
13.0	72 2 25.6	2 3 20.0	13.0	115 35 39.1	1 56 16.2	13.0	147 45 42.6	4 19 35.9
13.5	78 2 25.1	—1 33 37.5	13.5	121 29 45.6	+2 25 25.3	13.5	153 48 34.7	+4 37 26.4
14.0	83 59 56.3	1 3 3.3	14.0	127 25 12.8	2 53 7.9	14.0	159 54 52.1	4 52 19.3
14.5	89 55 33.7	0 31 55.8	14.5	133 22 39.5	3 19 7.4	14.5	166 5 8.9	5 4 0.3
15.0	95 49 54.6	—0 0 32.9	15.0	139 22 45.1	3 43 7.5	15.0	172 19 58.6	5 12 15.4
15.5	101 43 38.0	+0 30 48.2	15.5	145 26 9.0	4 4 51.4	15.5	178 39 53.6	5 16 51.3
16.0	107 37 24.7	+1 1 50.5	16.0	151 33 29.6	+4 24 2.3	16.0	185 5 24.4	+5 17 35.3
16.5	113 31 56.3	1 32 17.0	16.5	157 45 23.8	4 40 22.6	16.5	191 36 58.2	5 14 16.3
17.0	119 27 54.6	2 1 51.0	17.0	164 2 26.1	4 53 35.4	17.0	198 14 58.1	5 6 44.8
17.5	125 26 0.9	2 30 15.3	17.5	170 25 7.2	5 3 23.3	17.5	204 59 41.7	4 54 53.8
18.0	131 26 55.7	2 57 12.1	18.0	176 53 53.3	5 9 29.7	18.0	211 51 19.4	4 38 39.8
18.5	137 31 17.4	+3 22 23.5	18.5	183 29 4.4	+5 11 38.9	18.5	218 49 53.9	+4 18 3.9
19.0	143 39 41.9	3 45 30.7	19.0	190 10 53.8	5 9 37.0	19.0	225 55 18.4	3 53 12.6
19.5	149 52 41.5	4 6 14.6	19.5	196 59 26.3	5 3 12.9	19.5	233 7 15.7	3 24 17.2
20.0	156 10 44.2	4 24 15.4	20.0	203 54 37.5	4 52 18.8	20.0	240 25 18.2	2 51 38.8
20.5	162 34 12.5	4 39 13.6	20.5	210 56 13.2	4 36 51.8	20.5	247 48 47.1	2 15 44.1
21.0	169 3 22.6	+4 50 50.0	21.0	218 3 49.3	+4 16 54.8	21.0	255 16 53.4	+1 37 7.5
21.5	175 38 23.6	4 58 46.1	21.5	225 16 51.7	3 52 37.3	21.5	262 48 38.8	0 56 30.4
22.0	182 19 16.7	5 2 45.6	22.0	232 34 37.1	3 24 16.0	22.0	270 22 58.2	+0 14 39.4
22.5	189 5 54.7	5 2 34.3	22.5	239 56 14.7	2 52 14.8	22.5	277 58 40.5	—0 27 35.0
23.0	195 58 2.2	4 58 1.7	23.0	247 20 47.5	2 17 4.9	23.0	285 34 32.8	1 9 20.9
23.5	202 55 15.6	+4 49 1.8	23.5	254 47 14.8	+1 39 23.9	23.5	293 9 21.9	—1 49 47.3
24.0	209 57 3.8	4 35 33.9	24.0	262 14 34.6	0 59 54.2	24.0	300 41 58.5	2 28 6.1
24.5	217 2 49.5	4 17 43.0	24.5	269 41 45.9	+0 19 21.2	24.5	308 11 18.6	3 3 34.4
25.0	224 11 50.5	3 55 40.5	25.0	277 7 50.8	—0 21 27.6	25.0	315 36 25.7	3 35 35.9
25.5	231 23 21.5	3 29 44.2	25.5	284 31 56.8	1 1 45.5	25.5	322 56 32.8	4 3 41.5
26.0	238 36 36.3	+3 0 17.9	26.0	291 53 17.6	—1 40 47.9	26.0	330 11 3.2	—4 27 30.1
26.5	245 50 49.2	2 27 50.7	26.5	299 11 14.6	2 17 54.1	26.5	337 19 30.4	4 46 47.9
27.0	253 5 17.2	1 52 56.5	27.0	306 25 17.0	2 52 27.8	27.0	344 21 38.4	5 1 27.7
27.5	260 19 21.0	1 16 12.0	27.5	313 35 1.8	3 23 58.1	27.5	351 17 20.4	5 11 28.8
28.0	267 32 26.5	+0 38 16.2	28.0	320 40 13.2	3 51 59.9	28.0	358 6 37.7	5 16 55.3
28.5	274 44 5.0	—0 0 10.9	28.5	327 40 42.6	4 16 13.5	28.5	4 49 39.5	5 17 55.2
29.0	281 53 53.4	—0 38 30.0	29.0	334 36 26.5	—4 36 24.9	29.0	11 26 40.1	—5 14 39.5
29.5	289 1 34.2	1 16 2.9	29.5	341 27 26.5	4 52 24.8	29.5	17 57 58.8	5 7 21.8
30.0	296 6 54.9	1 52 13.7	30.0	348 13 47.9	5 4 8.1	30.0	24 23 58.3	4 56 17.2
30.5	303 9 46.9	2 26 29.2	30.5	354 55 39.1	5 11 33.9	30.5	30 45 3.4	4 41 42.1
31.0	310 10 4.8	2 58 19.5	31.0	1 33 10.1	5 14 44.7	31.0	37 1 40.6	4 23 53.7
31.5	317 7 45.6	—3 27 18.3	31.5	8 6 32.3	—5 13 45.9	31.5	43 14 16.7	—4 3 9.8

FOR GREENWICH MEAN NOON.

Date.		THE MOON'S EQUATOR.			☾ Mean Longitude of the Moon.
		i Inclination to Earth's Equator.	Δ Ascend'g Node on Earth's Equator to Ascending Node on Ecliptic.	☊′ Ascend'g Node on Earth's Equator.	
		° ′	° ′	° ′	° ′
Jan.	0	24 2.5	294 59.0	356 37.7	260 51.5
	10	24 1.7	294 27.9	356 36.9	32 37.3
	20	24 1.0	293 56.9	356 36.1	164 23.2
	30	24 0.2	293 25.8	356 35.3	296 9.0
Feb.	9	23 59.4	292 54.8	356 34.5	67 54.9
	19	23 58.7	292 23.7	356 33.7	199 40.7
March	1	23 57.9	291 52.7	356 33.0	331 26.5
	11	23 57.2	291 21.6	356 32.2	103 12.4
	21	23 56.4	290 50.5	356 31.5	234 58.2
	31	23 55.6	290 19.5	356 30.7	6 44.0
April	10	23 54.9	289 48.4	356 30.0	138 29.9
	20	23 54.1	289 17.2	356 29.4	270 15.7
	30	23 53.3	288 46.0	356 28.7	42 1.5
May	10	23 52.6	288 14.8	356 28.1	173 47.4
	20	23 51.8	287 43.6	356 27.4	305 33.2
	30	23 51.0	287 12.4	356 26.8	77 19.0
June	9	23 50.3	286 41.2	356 26.2	209 4.9
	19	23 49.5	286 10.0	356 25.7	340 50.7
	29	23 48.7	285 38.8	356 25.1	112 36.5
July	9	23 47.9	285 7.6	356 24.6	244 22.4
	19	23 47.1	284 36.3	356 24.0	16 8.2
	29	23 46.3	284 5.0	356 23.5	147 54.0
Aug.	8	23 45.5	283 33.6	356 23.0	279 39.9
	18	23 44.7	283 2.3	356 22.5	51 25.7
	28	23 43.9	282 30.9	356 22.0	183 11.5
Sept.	7	23 43.1	281 59.5	356 21.6	314 57.4
	17	23 42.3	281 28.2	356 21.2	86 43.2
	27	23 41.5	280 56.8	356 20.8	218 29.0
Oct.	7	23 40.7	280 25.4	356 20.5	350 14.9
	17	23 39.9	279 54.0	356 20.1	122 0.7
	27	23 39.1	279 22.6	356 19.7	253 46.5
Nov.	6	23 38.3	278 51.1	356 19.4	25 32.4
	16	23 37.5	278 19.5	356 19.1	157 18.2
	26	23 36.7	277 48.0	356 18.8	289 4.1
Dec.	6	23 35.8	277 16.4	356 18.5	60 49.9
	16	23 35.0	276 44.9	356 18.3	192 35.7
	26	23 34.2	276 13.3	356 18.1	324 21.6
	36	23 33.4	275 41.8	356 17.9	96 7.4

Mean Solar Days.	Motion of ☾
	° ′
0.1	1 19.06
0.2	2 38.12
0.3	3 57.18
0.4	5 16.23
0.5	6 35.29
0.6	7 54.35
0.7	9 13.41
0.8	10 32.47
0.9	11 51.53
1.0	13 10.58
2.0	26 21.17
3.0	39 31.75
4.0	52 42.33
5.0	65 52.92
6.0	79 3.50
7.0	92 14.09
8.0	105 24.67
9.0	118 35.25
10.0	131 45.84
Hours.	° ′
1	0 32.94
2	1 5.88
3	1 38.82
4	2 11.76
5	2 44.70
6	3 17.65
7	3 50.59
8	4 23.53
9	4 56.47
10	5 29.41
11	6 2.35
12	6 35.29
13	7 8.23
14	7 41.17
15	8 14.11
16	8 47.06
17	9 20.00
18	9 52.94
19	10 25.88
20	10 58.82
21	11 31.76
22	12 4.70
23	12 37.64

TABLE FOR THE LIBRATION OF THE MOON.

Argument, (☊—λ) or (☊—λ—180°).

☊ − λ	Δλ	$\frac{1}{a}$	B		☊ − λ	Δλ	$\frac{1}{a}$	B	
0°	0′.0	39	0° 0′.0	180°	46°	0′.6	56	1° 3′.9	134°
1	0.0	39	0 1.6	179	47	0.6	57	1 4.9	133
2	0.0	39	0 3.1	178	48	0.6	58	1 6.0	132
3	0.1	39	0 4.7	177	49	0.6	59	1 7.0	131
4	0.1	39	0 6.2	176	50	0.6	60	1 8.0	130
5	0.1	39	0 7.7	175	51	0.6	62	1 9.0	129
6	0.2	39	0 9.3	174	52	0.6	63	1 10.0	128
7	0.2	39	0 10.8	173	53	0.5	64	1 10.9	127
8	0.2	39	0 12.4	172	54	0.5	66	1 11.8	126
9	0.2	39	0 13.9	171	55	0.5	67	1 12.7	125
10	0.2	39	0 15.4	170	56	0.5	69	1 13.6	124
11	0.3	39	0 16.9	169	57	0.5	71	1 14.5	123
12	0.3	40	0 18.5	168	58	0.5	73	1 15.3	122
13	0.3	40	0 20.0	167	59	0.5	75	1 16.1	121
14	0.3	40	0 21.5	166	60	0.5	77	1 16.9	120
15	0.3	40	0 23.0	165	61	0.5	80	1 17.6	119
16	0.3	40	0 24.5	164	62	0.5	83	1 18.4	118
17	0.3	40	0 26.0	163	63	0.5	86	1 19.1	117
18	0.3	41	0 27.4	162	64	0.5	89	1 19.8	116
19	0.4	41	0 28.9	161	65	0.4	92	1 20.4	115
20	0.4	41	0 30.4	160	66	0.4	95	1 21.1	114
21	0.4	41	0 31.8	159	67	0.4	99	1 21.7	113
22	0.4	42	0 33.2	158	68	0.4	103	1 22.3	112
23	0.4	42	0 34.7	157	69	0.4	108	1 22.9	111
24	0.4	42	0 36.1	156	70	0.4	113	1 23.4	110
25	0.4	43	0 37.5	155	71	0.4	119	1 23.9	109
26	0.5	43	0 38.9	154	72	0.4	125	1 24.4	108
27	0.5	43	0 40.3	153	73	0.4	132	1 24.9	107
28	0.5	44	0 41.7	152	74	0.3	141	1 25.3	106
29	0.5	44	0 43.1	151	75	0.3	150	1 25.7	105
30	0.5	45	0 44.4	150	76	0.3	160	1 26.1	104
31	0.5	45	0 45.7	149	77	0.3	172	1 26.5	103
32	0.5	46	0 47.0	148	78	0.2	186	1 26.8	102
33	0.5	46	0 48.4	147	79	0.2	202	1 27.1	101
34	0.5	47	0 49.7	146	80	0.2	222	1 27.4	100
35	0.5	47	0 51.0	145	81	0.2	247	1 27.7	99
36	0.5	48	0 52.2	144	82	0.2	278	1 27.9	98
37	0.5	48	0 53.4	143	83	0.1	318	1 28.1	97
38	0.6	49	0 54.7	142	84	0.1	370	1 28.3	96
39	0.6	50	0 55.9	141	85	0.1	440	1 28.5	95
40	0.6	50	0 57.1	140	86	0.1	555	1 28.6	94
41	0.6	51	0 58.3	139	87	0.1	740	1 28.7	93
42	0.6	52	0 59.4	138	88	0.0	1110	1 28.7	92
43	0.6	53	1 0.6	137	89	0.0	2220	1 28.8	91
44	0.6	54	1 1.7	136	90	0.0	∞	1 28.8	90
45	0.6	55	1 2.8	135					
	Δλ	$\frac{1}{a}$	B	☊ − λ		Δλ	$\frac{1}{a}$	B	☊ − λ

Δλ has the sign of tan (λ—☊)
a has the sign of cos (☊—λ)
B has the sign of sin (☊—λ)

FOR GREENWICH MEAN NOON.

Date.	Apparent Obliquity of the Ecliptic. (Hansen.)	Equation of Equinoxes		Precession of Equinoxes in Longitude.	The Sun's		Mean Longitude of Moon's Ascending Node.
		In Longitude.	In R. A.		Aberration.	Hor. Par.	
Jan. 0	23° 27′ 9″.29	− 15″.77	− 0s.964	0″.00	− 20″.80	9″.00	111° 53′.8
10	9.46	15.45	0.945	1.38	20.79	9.00	111 22.1
20	9.67	15.24	0.932	2.75	20.77	8.99	110 50.3
30	9.92	15.16	0.927	4.13	20.74	8.98	110 18.5
Feb. 9	10.18	15.22	0.931	5.50	20.71	8.96	109 46.7
19	23 27 10.42	− 15.43	− 0.944	6.88	− 20.67	8.94	109 15.0
March 1	10.62	15.77	0.964	8.26	20.63	8.92	108 43.2
11	10.78	16.20	0.991	9.63	20.57	8.90	108 11.4
21	10.87	16.67	1.020	11.01	20.51	8.87	107 39.6
31	10.90	17.13	1.047	12.38	20.45	8.85	107 7.9
April 10	23 27 10.87	− 17.53	− 1.072	13.76	− 20.39	8.82	106 36.1
20	10.79	17.83	1.090	15.14	20.34	8.80	106 4.3
30	10.69	18.01	1.101	16.51	20.29	8.78	105 32.6
May 10	10.58	18.05	1.104	17.89	20.24	8.76	105 0.8
20	10.49	17.95	1.098	19.26	20.19	8.74	104 29.0
30	23 27 10.43	− 17.72	− 1.084	20.64	− 20.16	8.72	103 57.2
June 9	10.40	17.40	1.064	22.02	20.13	8.71	103 25.5
19	10.43	17.04	1.042	23.39	20.11	8.71	102 53.7
29	10.52	16.67	1.020	24.77	20.11	8.70	102 21.9
July 9	10.67	16.33	0.999	26.14	20.10	8.70	101 50.2
19	23 27 10.86	− 16.06	− 0.982	27.52	− 20.12	8.71	101 18.4
29	11.09	15.91	0.973	28.90	20.14	8.72	100 46.6
Aug. 8	11.34	15.88	0.971	30.27	20.17	8.73	100 14.8
18	11.60	15.99	0.978	31.65	20.20	8.75	99 43.1
28	11.83	16.22	0.992	33.02	20.24	8.77	99 11.3
Sept. 7	23 27 12.01	− 16.56	− 1.013	34.40	− 20.29	8.79	98 39.5
17	12.14	16.97	1.038	35.78	20.35	8.81	98 7.8
27	12.21	17.42	1.065	37.15	20.41	8.84	97 36.0
Oct. 7	12.22	17.84	1.091	38.53	20.47	8.87	97 4.2
17	12.18	18.19	1.112	39.90	20.53	8.88	96 32.4
27	23 27 12.10	− 18.43	− 1.127	41.28	− 20.59	8.91	96 0.7
Nov. 6	11.99	18.52	1.133	42.66	20.64	8.93	95 28.9
16	11.87	18.45	1.128	44.03	20.69	8.95	94 57.1
26	11.78	18.25	1.116	45.41	20.73	8.97	94 25.3
Dec. 6	11.74	17.94	1.097	46.78	20.76	8.98	93 53.6
16	23 27 11.76	− 17.55	− 1.073	48.16	− 20.78	8.99	93 21.8
26	11.83	17.12	1.046	49.54	20.79	9.00	92 50.0
36	23 27 11.95	− 16.69	− 1.021	50.91	− 20.79	9.00	92 18.3

Mean Obliquity, 1889.0, 23° 27′ 13″.17 (Hansen).
Mean Obliquity, 1889.0, 23° 27′ 12″.87 (Peters).

Precession for 1889	50″.2613	log 1.70123
Precession in a Solar Day	0″.1376	log 9.13863
Precession in a Sidereal Day	0″.1372	log 9.13744
Sun's Mean Equatorial Horizontal Parallax .	8″.848	log 0.94685

Daily Motion of ☊
−3′.177

PART II

ASTRONOMICAL EPHEMERIS

FOR THE

MERIDIAN OF WASHINGTON

FORMULÆ FOR THE REDUCTION OF THE POSITIONS OF THE FIXED STARS, USING THE NOTATION OF BESSEL, AND THE CONSTANTS OF PETERS AND STRUVE.

NOTATION.

τ, the time, reckoned in units of one year, from the beginning of the Besselian fictitious year, (1888, December $30^d.438$ = 1889, January $0^d.0-0^d.562$, Washington mean time),
α_0, δ_0, the star's mean right ascension and declination at the beginning of the fictitious year,
α, δ, the star's apparent right ascension and declination at the time τ,
μ, μ', the annual proper motion in right ascension and declination,
$\odot$, the sun's true longitude,
Ω, the longitude of the moon's ascending node,
ω, the obliquity of the ecliptic,
Γ, the longitude of the sun's perigee,
Γ', the longitude of the moon's perigee,
☾, the moon's mean longitude.

BESSELIAN STAR-NUMBERS.

$$\begin{aligned}
A = \tau &- 0.34249 \sin \Omega &&- 0.00011 \sin (3 \odot - \Gamma)\\
&+ 0.00410 \sin 2 \Omega &&- 0.00005 \sin 2 (\odot - \Omega)\\
&- 0.02521 \sin 2 \odot &&+ 0.00010 \sin 2 (\odot - \Gamma')\\
&+ 0.00293 \sin (\odot + 82^\circ\ 3') &&+ 0.00009 \sin (2 \Gamma' - \Omega)\\
&+ 0.00025 \sin (2 \odot - \Omega) &&+ 0.00005 \cos \Gamma'\\
&- 0.00405 \sin 2 \text{☾} &&+ 0.00004 \sin 2 \Gamma'\\
&+ 0.00135 \sin (\text{☾} - \Gamma')
\end{aligned}$$

$$\begin{aligned}
B = &- 9''.2239 \cos \Omega &&- 0''.0027 \cos (3 \odot - \Gamma)\\
&+ 0.0895 \cos 2 \Omega &&+ 0.0067 \cos (2 \odot - \Omega)\\
&- 0.5506 \cos 2 \odot &&+ 0.0024 \cos (2 \Gamma' - \Omega)\\
&- 0.0092 \cos (\odot + 281^\circ\ 2') &&- 0.0023 \sin \Gamma'\\
&- 0.0886 \cos 2 \text{☾} &&+ 0.0008 \cos 2 \Gamma'
\end{aligned}$$

$$C = - 20''.4451 \cos \omega \cos \odot$$
$$D = - 20.4451 \sin \odot$$
$$E = - 0.0461 \sin \Omega + 0''.0014 \sin 2 \Omega - 0''.0033 \sin 2 \odot$$

BESSEL'S *Star-Constants.*

$a = 3^s.07251 + 1^s.33687 \sin \alpha_0 \tan \delta_0$ = precession in right ascension
$b = \frac{1}{15} \cos \alpha_0 \tan \delta_0$
$c = \frac{1}{15} \cos \alpha_0 \sec \delta_0$
$d = \frac{1}{15} \sin \alpha_0 \sec \delta_0$
$a' = 20''.0531 \cos \alpha_0$ = precession in declination
$b' = - \sin \alpha_0$
$c' = \tan \omega \cos \delta_0 - \sin \alpha_0 \sin \delta_0$
$d' = \cos \alpha_0 \sin \delta_0$

Reduction to Apparent Position.

$\alpha = \alpha_0 + \tau\mu + Aa + Bb + Cc + Dd + E$ (in time)
$\delta = \delta_0 + \tau\mu' + Aa' + Bb' + Cc' + Dd'$ (in arc)

INDEPENDENT STAR-NUMBERS.

$f = 46''.0876\ A + E$ (in arc) $= 3^s.0725\ A + \frac{1}{15} E$ (in time)
$g \sin G = B \qquad h \sin H = C$
$g \cos G = 20''.0531\ A \qquad h \cos H = D \qquad i = C \tan \omega$

Reduction to Apparent Position.

$\alpha = \alpha_0 + f + \tau\mu + \frac{1}{15} g \sin (G + \alpha_0) \tan \delta_0 + \frac{1}{15} h \sin (H + \alpha_0) \sec \delta_0$ (in time)
$\delta = \delta_0 + \tau\mu' + g \cos (G + \alpha_0) + h \cos (H + \alpha_0) \sin \delta_0 + i \cos \delta_0$ (in arc)

NOTES.—(1) The independent star-numbers are more convenient, when only one or two apparent positions of a star are required, or when BESSEL'S star-constants are not known with sufficient accuracy. Otherwise, the Besselian star-numbers are more convenient.

(2) In using the star-constants of the *British Association Catalogue*, $a, b, c, d, a', b', c', d'$, must be changed to $c, d, a, b, -c', -d', -a', -b'$, respectively.

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.	Solar Day. (Sid. Hour.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.
Jan. 0	−9.4873	+0.6003	−0.5558	+1.3024	Feb. 15	−9.2306	+0.4312	−1.2005	+1.0374
1	9.4793	0.5975	0.5936	1.3009	16	9.2287	0.4233	1.2052	1.0251
2	9.4719	0.5928	0.6283	1.2992	17	9.2275	0.4183	1.2098	1.0122
3	9.4654	0.5867	0.6603	1.2973	18	9.2259	0.4163	1.2141	0.9988
4	9.4602	0.5802	0.6899	1.2953	($10^{\mathrm{h}}.0$) 19	9.2232	0.4169	1.2183	0.9849
($7^{\mathrm{h}}.0$) 5	−9.4563	+0.5739	−0.7174	+1.2931	20	−9.2185	+0.4192	−1.2223	+0.9703
6	9.4535	0.5690	0.7432	1.2908	21	9.2115	0.4219	1.2261	0.9551
7	9.4512	0.5660	0.7675	1.2883	22	9.2023	0.4236	1.2298	0.9393
8	9.4489	0.5651	0.7904	1.2857	23	9.1913	0.4231	1.2333	0.9227
9	9.4460	0.5660	0.8120	1.2829	24	9.1794	0.4198	1.2366	0.9053
10	−9.4421	+0.5679	−0.8324	+1.2800	25	−9.1677	+0.4135	−1.2398	+0.8871
11	9.4370	0.5701	0.8517	1.2769	26	9.1574	0.4047	1.2428	0.8679
12	9.4306	0.5714	0.8700	1.2737	27	9.1494	0.3943	1.2457	0.8477
13	9.4231	0.5711	0.8875	1.2703	28	9.1442	0.3837	1.2484	0.8264
14	9.4152	0.5686	0.9042	1.2667	Mar. 1	9.1416	0.3744	1.2510	0.8039
15	−9.4073	+0.5640	−0.9202	+1.2630	2	−9.1409	+0.3677	−1.2534	+0.7800
16	9.4000	0.5574	0.9354	1.2591	3	9.1409	0.3643	1.2557	0.7545
17	9.3940	0.5497	0.9500	1.2550	4	9.1406	0.3644	1.2578	0.7275
18	9.3893	0.5417	0.9640	1.2507	5	9.1387	0.3672	1.2598	0.6984
19	9.3858	0.5345	0.9774	1.2463	($11^{\mathrm{h}}.0$) 6	9.1346	0.3715	1.2616	0.6672
($8^{\mathrm{h}}.0$) 20	−9.3832	+0.5290	−0.9903	+1.2417	7	−9.1279	+0.3756	−1.2633	+0.6332
21	9.3807	0.5257	1.0027	1.2369	8	9.1187	0.3781	1.2649	0.5965
22	9.3779	0.5247	1.0146	1.2319	9	9.1078	0.3780	1.2663	0.5562
23	9.3740	0.5254	1.0260	1.2267	10	9.0963	0.3746	1.2676	0.5117
24	9.3687	0.5271	1.0370	1.2213	11	9.0852	0.3681	1.2687	0.4620
25	−9.3616	+0.5286	−1.0476	+1.2157	12	−9.0760	+0.3592	−1.2697	+0.4055
26	9.3531	0.5289	1.0578	1.2099	13	9.0693	0.3491	1.2706	0.3406
27	9.3436	0.5273	1.0677	1.2039	14	9.0656	0.3394	1.2714	0.2642
28	9.3337	0.5232	1.0772	1.1976	15	9.0640	0.3316	1.2720	0.1713
29	9.3242	0.5168	1.0863	1.1911	16	9.0640	0.3272	1.2725	0.0530
30	−9.3160	+0.5085	−1.0951	+1.1845	17	−9.0637	+0.3266	−1.2728	+9.8902
31	9.3095	0.4993	1.1037	1.1775	18	9.0619	0.3297	1.2730	9.6244
Feb. 1	9.3049	0.4901	1.1119	1.1703	19	9.0575	0.3352	1.2731	+8.8254
2	9.3019	0.4823	1.1198	1.1629	20	9.0499	0.3417	1.2731	−9.4678
3	9.3002	0.4766	1.1274	1.1551	21	9.0386	0.3475	1.2729	9.8112
($9^{\mathrm{h}}.0$) 4	−9.2987	+0.4735	−1.1348	+1.1471	($12^{\mathrm{h}}.0$) 22	−9.0244	+0.3510	−1.2726	−0.0003
5	9.2967	0.4729	1.1419	1.1388	23	9.0080	0.3515	1.2722	0.1313
6	9.2935	0.4741	1.1488	1.1303	24	8.9911	0.3485	1.2716	0.2305
7	9.2885	0.4759	1.1554	1.1214	25	8.9757	0.3425	1.2709	0.3121
8	9.2818	0.4773	1.1618	1.1122	26	8.9630	0.3342	1.2701	0.3806
9	−9.2736	+0.4769	−1.1680	+1.1026	27	−8.9542	+0.3254	−1.2692	−0.4396
10	9.2644	0.4742	1.1740	1.0927	28	8.9494	0.3176	1.2681	0.4915
11	9.2550	0.4688	1.1797	1.0825	29	8.9479	0.3125	1.2669	0.5376
12	9.2463	0.4609	1.1852	1.0718	30	8.9481	0.3111	1.2655	0.5792
13	9.2392	0.4512	1.1905	1.0608	31	8.9482	0.3137	1.2640	0.6170
14	−9.2340	+0.4409	−1.1956	+1.0493	32	−8.9463	+0.3197	−1.2624	−0.6516
15	−9.2306	+0.4312	−1.2005	+1.0374	33	−8.9409	+0.3277	−1.2607	−0.6836

$E = -0''.04$

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.	Solar Day. (Sid. Hour.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.
Apr. 1	−8.9463	+0.3197	−1.2624	−0.6516	May 17	+8.3960	+0.4097	−1.0043	−1.2363
2	8.9409	0.3277	1.2607	0.6836	18	8.4755	0.4083	0.9926	1.2408
3	8.9316	0.3359	1.2588	0.7132	19	8.5359	0.4043	0.9805	1.2452
4	8.9179	0.3429	1.2568	0.7408	20	8.5804	0.3988	0.9680	1.2495
5	8.9006	0.3471	1.2546	0.7666	(16^{h}.0) 21	8.6114	0.3932	0.9550	1.2535
(13^{h}.0) 6	−8.8811	+0.3480	−1.2523	−0.7908	22	+8.6324	+0.3889	−0.9414	−1.2575
7	8.8614	0.3454	1.2499	0.8136	23	8.6470	0.3871	0.9273	1.2612
8	8.8436	0.3401	1.2474	0.8351	24	8.6592	0.3885	0.9126	1.2648
9	8.8294	0.3330	1.2447	0.8556	25	8.6727	0.3929	0.8973	1.2683
10	8.8198	0.3260	1.2418	0.8749	26	8.6902	0.3995	0.8812	1.2716
11	−8.8147	+0.3205	−1.2388	−0.8933	27	+8.7136	+0.4072	−0.8645	−1.2747
12	8.8120	0.3181	1.2356	0.9108	28	8.7420	0.4144	0.8469	1.2777
13	8.8103	0.3196	1.2323	0.9275	29	8.7742	0.4199	0.8285	1.2806
14	8.8062	0.3248	1.2289	0.9434	30	8.8073	0.4227	0.8092	1.2833
15	8.7977	0.3328	1.2253	0.9587	31	8.8387	0.4225	0.7888	1.2859
16	−8.7831	+0.3422	−1.2215	−0.9733	June 1	+8.8665	+0.4192	−0.7673	−1.2883
17	8.7610	0.3511	1.2176	0.9873	2	8.8896	0.4138	0.7445	1.2907
18	8.7317	0.3582	1.2135	1.0007	3	8.9075	0.4073	0.7204	1.2928
19	8.6961	0.3624	1.2093	1.0136	4	8.9208	0.4010	0.6948	1.2949
20	8.6561	0.3631	1.2049	1.0260	5	8.9305	0.3965	0.6674	1.2968
(14^{h}.0) 21	−8.6148	+0.3606	−1.2003	−1.0379	(17^{h}.0) 6	+8.9386	+0.3946	−0.6380	−1.2986
22	8.5767	0.3557	1.1956	1.0494	7	8.9467	0.3958	0.6066	1.3003
23	8.5452	0.3497	1.1906	1.0605	8	8.9567	0.3999	0.5722	1.3018
24	8.5221	0.3442	1.1855	1.0711	9	8.9698	0.4058	0.5350	1.3032
25	8.5079	0.3407	1.1803	1.0814	10	8.9865	0.4122	0.4940	1.3045
26	−8.4994	+0.3404	−1.1748	−1.0913	11	+9.0063	+0.4178	−0.4488	−1.3057
27	8.4921	0.3436	1.1691	1.1009	12	9.0281	0.4212	0.3981	1.3067
28	8.4803	0.3504	1.1632	1.1101	13	9.0502	0.4218	0.3406	1.3076
29	8.4589	0.3592	1.1572	1.1190	14	9.0709	0.4192	0.2742	1.3084
30	8.4233	0.3687	1.1509	1.1276	15	9.0893	0.4138	0.1955	1.3091
May 1	−8.3698	+0.3772	−1.1444	−1.1359	16	+9.1046	+0.4065	−0.1035	−1.3096
2	8.2949	0.3836	1.1377	1.1439	17	9.1164	0.3985	9.9810	1.3100
3	8.1929	0.3868	1.1307	1.1517	18	9.1250	0.3912	9.8097	1.3103
4	8.0603	0.3868	1.1235	1.1592	19	9.1313	0.3860	9.5224	1.3105
5	7.8865	0.3838	1.1161	1.1664	20	9.1366	0.3837	−7.9542	1.3106
(15^{h}.0) 6	−7.6551	+0.3789	−1.1084	−1.1734	(18^{h}.0) 21	+9.1418	+0.3846	+9.4817	−1.3105
7	7.3284	0.3734	1.1005	1.1802	22	9.1482	0.3881	9.7891	1.3104
8	−6.6435	0.3688	1.0923	1.1867	23	9.1565	0.3931	9.9672	1.3101
9	+6.8692	0.3665	1.0838	1.1930	24	9.1670	0.3982	0.0930	1.3096
10	7.2406	0.3674	1.0750	1.1991	25	9.1793	0.4020	0.1903	1.3091
11	+7.4639	+0.3717	−1.0659	−1.2050	26	+9.1928	+0.4032	+0.2697	−1.3084
12	7.6675	0.3788	1.0565	1.2107	27	9.2065	0.4013	0.3367	1.3077
13	7.8567	0.3874	1.0468	1.2162	28	9.2193	0.3961	0.3946	1.3068
14	8.0261	0.3960	1.0367	1.2215	29	9.2305	0.3882	0.4456	1.3057
15	8.1726	0.4032	1.0263	1.2266	30	9.2397	0.3785	0.4911	1.3046
16	+8.2962	+0.4080	−1.0155	−1.2315	31	+9.2466	+0.3686	+0.5321	−1.3033
17	+8.3960	+0.4097	−1.0043	−1.2363	32	+9.2517	+0.3599	+0.5695	−1.3019

$E = -0''.05$

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.	Solar Day. (Sid. Hour.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.
July 1	+9.2466	+0.3686	+0.5321	−1.3033	Aug. 16	+9.4877	+0.1032	+1.1835	−1.0751
2	9.2517	0.3599	0.5695	1.3019	17	9.4904	0.1081	1.1887	1.0647
3	9.2557	0.3538	0.6039	1.3004	18	9.4941	0.1124	1.1936	1.0539
4	9.2594	0.3510	0.6354	1.2987	19	9.4988	0.1136	1.1984	1.0427
5	9.2629	0.3514	0.6650	1.2970	20	9.5039	0.1095	1.2030	1.0311
$(19^{\mathrm{h}}.0)$ 6	+9.2697	+0.3545	+0.6925	−1.2951	$(22^{\mathrm{h}}.0)$ 21	+9.5090	+0.0993	+1.2074	−1.0191
7	9.2772	0.3587	0.7180	1.2930	22	9.5137	0.0828	1.2117	1.0065
8	9.2866	0.3624	0.7424	1.2909	23	9.5175	0.0611	1.2158	0.9935
9	9.2975	0.3643	0.7652	1.2886	24	9.5202	0.0361	1.2197	0.9799
10	9.3090	0.3631	0.7867	1.2862	25	9.5219	0.0113	1.2235	0.9658
11	+9.3204	+0.3583	+0.8071	−1.2836	26	+9.5227	+9.9899	+1.2271	−0.9510
12	9.3308	0.3501	0.8265	1.2809	27	9.5230	9.9751	1.2306	0.9356
13	9.3397	0.3392	0.8449	1.2781	28	9.5235	9.9687	1.2340	0.9195
14	9.3467	0.3268	0.8624	1.2751	29	9.5244	9.9702	1.2371	0.9026
15	9.3519	0.3146	0.8792	1.2720	30	9.5263	9.9771	1.2402	0.8849
16	+9.3556	+0.3042	+0.8952	−1.2687	31	+9.5292	+9.9860	+1.2431	−0.8663
17	9.3583	0.2970	0.9106	1.2653	Sept. 1	9.5332	9.9928	1.2458	0.8468
18	9.3607	0.2938	0.9253	1.2617	2	9.5380	9.9946	1.2485	0.8262
19	9.3637	0.2941	0.9394	1.2580	3	9.5431	9.9889	1.2509	0.8044
20	9.3677	0.2969	0.9530	1.2541	4	9.5481	9.9751	1.2533	0.7813
$(20^{\mathrm{h}}.0)$ 21	+9.3730	+0.3005	+0.9660	−1.2501	$(23^{\mathrm{h}}.0)$ 5	+9.5525	+9.9535	+1.2555	−0.7568
22	9.3796	0.3030	0.9785	1.2459	6	9.5560	9.9256	1.2576	0.7306
23	9.3871	0.3029	0.9906	1.2416	7	9.5584	9.8949	1.2595	0.7027
24	9.3951	0.2991	1.0024	1.2371	8	9.5597	9.8657	1.2613	0.6726
25	9.4028	0.2911	1.0134	1.2324	9	9.5602	9.8428	1.2630	0.6402
26	+9.4097	+0.2793	+1.0242	−1.2275	10	+9.5604	+9.8305	+1.2645	−0.6051
27	9.4153	0.2646	1.0346	1.2225	11	9.5605	9.8300	1.2660	0.5666
28	9.4195	0.2488	1.0447	1.2173	12	9.5611	9.8396	1.2672	0.5242
29	9.4224	0.2337	1.0544	1.2119	13	9.5626	9.8550	1.2684	0.4772
30	9.4244	0.2215	1.0638	1.2063	14	9.5649	9.8706	1.2694	0.4241
31	+9.4260	+0.2135	+1.0729	−1.2005	15	+9.5681	+9.8820	+1.2703	−0.3637
Aug. 1	9.4278	0.2103	1.0817	1.1945	16	9.5718	9.8856	1.2711	0.2930
2	9.4304	0.2111	1.0902	1.1883	17	9.5757	9.8795	1.2718	0.2085
3	9.4343	0.2143	1.0984	1.1819	18	9.5794	9.8630	1.2723	0.1094
4	9.4394	0.2177	1.1063	1.1752	19	9.5825	9.8374	1.2727	9.9636
5	+9.4457	+0.2193	+1.1140	−1.1684	$(0^{\mathrm{h}}.0)$ 20	+9.5847	+9.8051	+1.2730	−9.7562
$(21^{\mathrm{h}}.0)$ 6	9.4528	0.2173	1.1214	1.1612	21	9.5860	9.7712	1.2731	−9.3450
7	9.4601	0.2105	1.1286	1.1539	22	9.5865	9.7416	1.2731	+9.1096
8	9.4670	0.1986	1.1356	1.1463	23	9.5866	9.7226	1.2730	9.6793
9	9.4728	0.1823	1.1423	1.1384	24	9.5865	9.7189	1.2728	9.9178
10	+9.4775	+0.1630	+1.1488	−1.1303	25	+9.5869	+9.7302	+1.2724	+0.0709
11	9.4808	0.1430	1.1551	1.1219	26	9.5879	9.7521	1.2719	0.1839
12	9.4828	0.1248	1.1612	1.1131	27	9.5899	9.7782	1.2713	0.2734
13	9.4840	0.1108	1.1671	1.1041	28	9.5929	9.8018	1.2705	0.3474
14	9.4849	0.1027	1.1727	1.0948	29	9.5967	9.8184	1.2697	0.4105
15	+9.4859	+0.1005	+1.1782	−1.0851	30	+9.6010	+9.8246	+1.2686	+0.4656
16	+9.4877	+0.1032	+1.1835	−1.0751	31	+9.6053	+9.8192	+1.2675	+0.5144

$E = -0''.04$

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.	Solar Day. (Sid. Hour.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.
Oct. 1	+9.6053	+9.8192	+1.2675	+0.5144	Nov. 16	+9.7094	+9.9183	+1.0307	+1.2244
2	9.6093	9.8025	1.2662	0.5582	17	9.7103	9.9185	1.0195	1.2297
3	9.6126	9.7768	1.2648	0.5979	18	9.7114	9.9281	1.0079	1.2347
4	9.6149	9.7459	1.2633	0.6341	19	9.7129	9.9454	0.9958	1.2396
($1^{h}.0$) 5	9.6164	9.7160	1.2616	0.6674	($4^{h}.0$) 20	9.7150	9.9673	0.9833	1.2443
6	+9.6171	+9.6942	+1.2598	+0.6983	21	+9.7179	+9.9896	+0.9702	+1.2487
7	9.6174	9.6865	1.2578	0.7270	22	9.7215	0.0085	0.9566	1.2531
8	9.6175	9.6956	1.2557	0.7538	23	9.7256	0.0216	0.9424	1.2572
9	9.6180	9.7188	1.2535	0.7790	24	9.7300	0.0272	0.9275	1.2612
10	9.6192	9.7503	1.2511	0.8026	25	9.7343	0.0252	0.9120	1.2650
11	+9.6212	+9.7828	+1.2486	+0.8250	26	+9.7383	+0.0163	+0.8957	+1.2686
12	9.6239	9.8100	1.2459	0.8461	27	9.7416	0.0028	0.8787	1.2721
13	9.6273	9.8285	1.2431	0.8661	28	9.7443	9.9876	0.8609	1.2754
14	9.6310	9.8357	1.2401	0.8852	29	9.7464	9.9746	0.8421	1.2785
15	9.6346	9.8316	1.2370	0.9033	30	9.7479	9.9672	0.8223	1.2815
16	+9.6378	+9.8172	+1.2337	+0.9206	Dec. 1	+9.7493	+9.9676	+0.8014	+1.2843
17	9.6403	9.7958	1.2303	0.9371	2	9.7506	9.9762	0.7794	1.2870
18	9.6420	9.7717	1.2267	0.9529	3	9.7523	9.9911	0.7560	1.2895
19	9.6431	9.7513	1.2229	0.9680	4	9.7546	0.0091	0.7311	1.2919
20	9.6436	9.7409	1.2190	0.9825	($5^{h}.0$) 5	9.7574	0.0264	0.7045	1.2942
($2^{h}.0$) 21	+9.6439	+9.7444	+1.2149	+0.9965	6	+9.7607	+0.0398	+0.6761	+1.2962
22	9.6445	9.7619	1.2106	1.0097	7	9.7645	0.0471	0.6455	1.2982
23	9.6456	9.7899	1.2062	1.0225	8	9.7683	0.0471	0.6124	1.3000
24	9.6475	9.8222	1.2015	1.0349	9	9.7719	0.0398	0.5765	1.3016
25	9.6504	9.8529	1.1967	1.0467	10	9.7751	0.0263	0.5371	1.3032
26	+9.6540	+9.8776	+1.1917	+1.0582	11	+9.7778	+0.0090	+0.4937	+1.3045
27	9.6581	9.8933	1.1865	1.0692	12	9.7799	9.9910	0.4452	1.3057
28	9.6625	9.8989	1.1811	1.0798	13	9.7815	9.9759	0.3906	1.3068
29	9.6667	9.8948	1.1755	1.0901	14	9.7828	9.9671	0.3279	1.3078
30	9.6703	9.8826	1.1697	1.1000	15	9.7841	9.9664	0.2543	1.3086
31	+9.6733	+9.8657	+1.1636	+1.1095	16	+9.7856	+9.9735	+0.1655	+1.3093
Nov. 1	9.6754	9.8485	1.1573	1.1187	17	9.7875	9.9863	0.0537	1.3098
2	9.6768	9.8363	1.1508	1.1276	18	9.7900	0.0010	9.9023	1.3102
3	9.6778	9.8335	1.1441	1.1362	19	9.7932	0.0139	9.6677	1.3105
4	9.6786	9.8421	1.1372	1.1445	20	9.7969	0.0222	+9.1199	1.3106
($3^{h}.0$) 5	+9.6796	+9.8614	+1.1299	+1.1525	($6^{h}.0$) 21	+9.8008	+0.0235	−9.3045	+1.3106
6	9.6811	9.8873	1.1224	1.1602	22	9.8048	0.0169	9.7285	1.3104
7	9.6832	9.9151	1.1147	1.1677	23	9.8085	0.0027	9.9472	1.3101
8	9.6861	9.9403	1.1066	1.1750	24	9.8118	9.9821	0.0795	1.3097
9	9.6896	9.9594	1.0983	1.1819	25	9.8144	9.9579	0.1860	1.3091
10	+9.6934	+9.9702	+1.0897	+1.1887	26	+9.8165	+9.9337	−0.2709	+1.3084
11	9.6973	9.9723	1.0807	1.1952	27	9.8181	9.9138	0.3419	1.3076
12	9.7009	9.9665	1.0714	1.2015	28	9.8194	9.9015	0.4029	1.3066
13	9.7039	9.9548	1.0618	1.2075	29	9.8207	9.8988	0.4562	1.3055
14	9.7063	9.9401	1.0518	1.2134	30	9.8221	9.9045	0.5030	1.3042
15	+9.7081	+9.9266	+1.0415	+1.2190	31	+9.8240	+9.9158	−0.5461	+1.3028
16	+9.7094	+9.9183	+1.0307	+1.2244	32	+9.8263	+9.9284	−0.5847	+1.3013

$E = -0''.05$

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	τ	f		G		H		Log g.	Log h.	i	Log i.
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	"	s	° '	h m	° '	h m			"	
Jan. 0	0.0029	−14.20	−0.946	147 6	9 48.4	349 50	23 19.3	+0.8654	+1.3093	−1.56	−0.1929
1	0.0057	13.94	0.929	146 48	9 47.2	348 54	23 15.6	0.8590	1.3091	1.70	0.2307
2	0.0084	13.70	0.913	146 38	9 46.5	347 57	23 11.8	0.8523	1.3088	1.84	0.2654
3	0.0111	13.50	0.900	146 36	9 46.4	347 1	23 8.1	0.8460	1.3085	1.98	0.2974
4	0.0139	13.34	0.889	146 41	9 46.7	346 4	23 4.3	0.8404	1.3082	2.13	0.3270
($7^{h}.0$) 5	0.0166	−13.22	−0.881	146 49	9 47.3	345 7	23 0.5	+0.8358	+1.3079	−2.26	−0.3547
6	0.0193	13.14	0.875	146 57	9 47.8	344 10	22 56.7	0.8323	1.3076	2.40	0.3806
7	0.0221	13.07	0.871	147 0	9 48.0	343 14	22 52.9	0.8298	1.3072	2.54	0.4048
8	0.0248	13.00	0.866	146 55	9 47.7	342 17	22 49.1	0.8279	1.3068	2.68	0.4276
9	0.0276	12.91	0.861	146 41	9 46.7	341 19	22 45.3	0.8262	1.3064	2.81	0.4492
10	0.0303	−12.80	−0.853	146 20	9 45.3	340 22	22 41.5	+0.8241	+1.3060	−2.95	−0.4696
11	0.0330	12.65	0.843	145 53	9 43.5	339 25	22 37.7	0.8212	1.3056	3.08	0.4890
12	0.0358	12.46	0.831	145 25	9 41.7	338 27	22 33.8	0.8172	1.3051	3.22	0.5074
13	0.0385	12.25	0.817	144 58	9 39.9	337 30	22 30.0	0.8121	1.3047	3.35	0.5249
14	0.0412	12.03	0.802	144 38	9 38.5	336 32	22 26.1	0.8060	1.3042	3.48	0.5416
15	0.0440	−11.81	−0.788	144 25	9 37.7	335 35	22 22.3	+0.7992	+1.3037	−3.61	−0.5576
16	0.0467	11.62	0.775	144 23	9 37.5	334 37	22 18.5	0.7922	1.3032	3.74	0.5728
17	0.0495	11.46	0.764	144 29	9 37.9	333 39	22 14.6	0.7856	1.3027	3.87	0.5874
18	0.0522	11.34	0.756	144 41	9 38.7	332 40	22 10.7	0.7798	1.3021	3.99	0.6014
19	0.0549	11.24	0.750	144 55	9 39.7	331 42	22 6.8	0.7750	1.3016	4.12	0.6148
($8^{h}.0$) 20	0.0577	−11.18	−0.745	145 6	9 40.4	330 44	22 2.9	+0.7715	+1.3010	−4.24	−0.6277
21	0.0604	11.12	0.741	145 9	9 40.6	329 45	21 59.0	0.7688	1.3005	4.37	0.6400
22	0.0631	11.04	0.736	145 3	9 40.2	328 46	21 55.1	0.7665	1.2999	4.49	0.6520
23	0.0659	10.95	0.730	144 45	9 39.0	327 47	21 51.1	0.7642	1.2993	4.61	0.6634
24	0.0686	10.81	0.721	144 19	9 37.3	326 48	21 47.2	0.7612	1.2987	4.73	0.6745
25	0.0714	−10.64	−0.709	143 47	9 35.1	325 49	21 43.3	+0.7571	+1.2981	−4.84	−0.6850
26	0.0741	10.43	0.695	143 13	9 32.9	324 50	21 39.3	0.7517	1.2974	4.96	0.6952
27	0.0768	10.21	0.680	142 43	9 30.9	323 50	21 35.3	0.7450	1.2968	5.07	0.7051
28	0.0796	9.98	0.665	142 21	9 29.4	322 51	21 31.4	0.7373	1.2962	5.18	0.7146
29	0.0823	9.77	0.651	142 9	9 28.6	321 51	21 27.4	0.7290	1.2955	5.29	0.7238
30	0.0851	− 9.58	−0.639	142 9	9 28.6	320 51	21 23.4	+0.7207	+1.2949	−5.40	−0.7326
31	0.0878	9.44	0.630	142 20	9 29.3	319 51	21 19.4	0.7132	1.2942	5.51	0.7411
Feb. 1	0.0905	9.34	0.624	142 37	9 30.5	318 50	21 15.3	0.7069	1.2936	5.61	0.7493
2	0.0933	9.28	0.619	142 56	9 31.7	317 50	21 11.3	0.7022	1.2929	5.72	0.7572
3	0.0960	9.24	0.616	143 11	9 32.7	316 49	21 7.3	0.6990	1.2922	5.82	0.7649
($9^{h}.0$) 4	0.0987	− 9.21	−0.614	143 17	9 33.1	315 49	21 3.3	+0.6969	+1.2916	−5.92	−0.7722
5	0.1015	9.17	0.611	143 11	9 32.7	314 48	20 59.2	0.6954	1.2909	6.02	0.7793
6	0.1042	9.10	0.607	142 55	9 31.7	313 47	20 55.1	0.6938	1.2903	6.11	0.7862
7	0.1070	9.00	0.600	142 29	9 29.9	312 45	20 51.0	0.6913	1.2896	6.21	0.7929
8	0.1097	8.86	0.591	141 58	9 27.9	311 44	20 46.9	0.6876	1.2889	6.30	0.7993
9	0.1124	− 8.69	−0.580	141 28	9 25.9	310 42	20 42.8	+0.6824	+1.2883	−6.39	−0.8054
10	0.1152	8.51	0.567	141 3	9 24.2	309 41	20 38.7	0.6757	1.2876	6.48	0.8113
11	0.1179	8.33	0.555	140 48	9 23.2	308 39	20 34.6	0.6680	1.2870	6.56	0.8171
12	0.1206	8.17	0.544	140 44	9 22.9	307 37	20 30.5	0.6596	1.2863	6.65	0.8226
13	0.1234	8.03	0.536	140 54	9 23.6	306 34	20 26.3	0.6514	1.2857	6.73	0.8279
14	0.1261	− 7.94	−0.530	141 14	9 24.9	305 32	20 22.1	+0.6442	+1.2851	−6.81	−0.8330
15	0.1289	− 7.88	−0.525	141 39	9 26.6	304 29	20 17.9	+0.6384	+1.2844	−6.89	−0.8379

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	τ	*f*		*G*		*H*		Log *g*.	Log *h*.	*i*	Log *i*.
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	″	s	° ′	h m	° ′	h m			″	
Feb. 15	0.1289	−7.88	−0.525	141 39	9 26.6	304 29	20 17.9	+0.6384	+1.2844	−6.89	−0.8379
16	0.1316	7.85	0.523	142 2	9 28.1	303 27	20 13.8	0.6342	1.2838	6.96	0.8426
17	0.1343	7.82	0.522	142 16	9 29.1	302 24	20 9.6	0.6315	1.2832	7.03	0.8472
18	0.1371	7.80	0.520	142 18	9 29.2	301 21	20 5.4	0.6298	1.2826	7.10	0.8515
(10^{h}.0) 19	0.1398	7.75	0.516	142 5	9 28.3	300 18	20 1.2	0.6284	1.2821	7.17	0.8557
20	0.1425	−7.66	−0.511	141 38	9 26.5	299 14	19 56.9	+0.6264	+1.2815	−7.24	−0.8597
21	0.1453	7.54	0.503	141 1	9 24.1	298 11	19 52.7	0.6231	1.2809	7.31	0.8636
22	0.1480	7.39	0.492	140 18	9 21.2	297 7	19 48.5	0.6183	1.2804	7.37	0.8673
23	0.1508	7.20	0.480	139 37	9 18.5	296 4	19 44.3	0.6116	1.2799	7.43	0.8707
24	0.1535	7.01	0.467	139 4	9 16.3	295 0	19 40.0	0.6034	1.2794	7.48	0.8741
25	0.1562	−6.82	−0.455	138 43	9 14.9	293 56	19 35.7	+0.5940	+1.2789	−7.54	−0.8772
26	0.1590	6.66	0.444	138 37	9 14.5	292 52	19 31.5	0.5844	1.2784	7.59	0.8803
27	0.1617	6.54	0.436	138 46	9 15.1	291 48	19 27.2	0.5753	1.2780	7.64	0.8831
28	0.1645	6.47	0.431	139 8	9 16.5	290 44	19 22.9	0.5678	1.2775	7.69	0.8858
Mar. 1	0.1672	6.43	0.428	139 33	9 18.2	289 39	19 18.6	0.5623	1.2771	7.73	0.8884
2	0.1699	−6.42	−0.428	139 57	9 19.8	288 35	19 14.3	+0.5591	+1.2767	−7.78	−0.8909
3	0.1727	6.42	0.428	140 10	9 20.7	287 30	19 10.0	0.5578	1.2762	7.82	0.8931
4	0.1754	6.41	0.427	140 8	9 20.5	286 26	19 5.7	0.5576	1.2759	7.86	0.8952
5	0.1781	6.39	0.426	139 50	9 19.3	285 21	19 1.4	0.5577	1.2755	7.89	0.8972
(11^{h}.0) 6	0.1809	6.33	0.422	139 18	9 17.2	284 17	18 57.1	0.5571	1.2752	7.93	0.8990
7	0.1836	−6.23	−0.415	138 35	9 14.3	283 12	18 52.8	+0.5550	+1.2749	−7.96	−0.9008
8	0.1864	6.10	0.407	137 49	9 11.3	282 7	18 48.5	0.5511	1.2746	7.99	0.9023
9	0.1891	5.95	0.397	137 6	9 8.4	281 2	18 44.1	0.5451	1.2744	8.01	0.9037
10	0.1918	5.80	0.386	136 34	9 6.3	279 57	18 39.8	0.5374	1.2742	8.04	0.9050
11	0.1946	5.65	0.377	136 16	9 5.1	278 52	18 35.5	0.5285	1.2740	8.06	0.9062
12	0.1973	−5.53	−0.369	136 15	9 5.0	277 47	18 31.1	+0.5194	+1.2738	−8.08	−0.9072
13	0.2000	5.45	0.363	136 29	9 5.9	276 42	18 26.8	0.5111	1.2736	8.09	0.9081
14	0.2028	5.40	0.360	136 52	9 7.5	275 37	18 22.5	0.5045	1.2735	8.11	0.9088
15	0.2055	5.39	0.359	137 17	9 9.1	274 32	18 18.1	0.5001	1.2734	8.12	0.9094
16	0.2083	5.38	0.359	137 34	9 10.3	273 27	18 13.8	0.4981	1.2733	8.13	0.9099
17	0.2110	−5.38	−0.359	137 35	9 10.3	272 22	18 9.5	+0.4976	+1.2732	−8.13	−0.9102
18	0.2137	5.36	0.357	137 16	9 9.1	271 17	18 5.1	0.4980	1.2732	8.14	0.9104
19	0.2165	5.31	0.354	136 37	9 6.5	270 12	18 0.8	0.4983	1.2731	8.14	0.9106
20	0.2192	5.21	0.348	135 41	9 2.7	269 7	17 56.5	0.4975	1.2731	8.14	0.9105
21	0.2219	5.08	0.339	134 34	8 58.3	268 2	17 52.1	0.4947	1.2732	8.14	0.9104
(12^{h}.0) 22	0.2247	−4.92	−0.328	133 23	8 53.5	266 58	17 47.9	+0.4896	+1.2732	−8.13	−0.9100
23	0.2274	4.74	0.316	132 17	8 49.1	265 53	17 43.5	0.4823	1.2733	8.12	0.9096
24	0.2302	4.56	0.304	131 22	8 45.5	264 48	17 39.2	0.4732	1.2734	8.11	0.9091
25	0.2329	4.40	0.294	130 45	8 43.0	263 44	17 34.9	0.4631	1.2735	8.10	0.9083
26	0.2356	4.28	0.285	130 28	8 41.9	262 39	17 30.6	0.4530	1.2737	8.08	0.9075
27	0.2384	−4.19	−0.280	130 28	8 41.9	261 35	17 26.3	+0.4441	+1.2739	−8.07	−0.9066
28	0.2411	4.15	0.276	130 40	8 42.7	260 30	17 22.0	0.4376	1.2741	8.05	0.9055
29	0.2438	4.13	0.276	130 54	8 43.6	259 26	17 17.7	0.4340	1.2743	8.02	0.9043
30	0.2466	4.14	0.276	131 0	8 44.0	258 22	17 13.5	0.4333	1.2745	8.00	0.9029
31	0.2493	4.14	0.276	130 50	8 43.3	257 18	17 9.2	0.4349	1.2748	7.97	0.9015
32	0.2521	−4.12	−0.275	130 19	8 41.3	256 14	17 4.9	+0.4375	+1.2751	−7.94	−0.8998
33	0.2548	−4.07	−0.271	129 27	8 37.8	255 10	17 0.7	+0.4400	+1.2754	−7.91	−0.8981

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	τ	f		G		H		Log g.	Log h.	i	Log i.
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	″	s	° ′	h m	° ′	h m			″	
Apr. 1	0.2521	−4.12	−0.275	130 19	8 41.3	256 14	17 4.9	+0.4375	+1.2751	−7.94	−0.8998
2	0.2548	4.07	0.271	129 27	8 37.8	255 10	17 0.7	0.4400	1.2754	7.91	0.8981
3	0.2575	3.98	0.266	128 19	8 33.3	254 7	16 56.5	0.4413	1.2757	7.87	0.8962
4	0.2603	3.86	0.257	127 1	8 28.1	253 3	16 52.2	0.4406	1.2761	7.84	0.8942
5	0.2630	3.71	0.247	125 39	8 22.6	252 0	16 48.0	0.4372	1.2764	7.80	0.8921
($13^{\rm h}.0$) 6	0.2658	−3.55	−0.237	124 23	8 17.5	250 56	16 43.7	+0.4314	+1.2768	−7.76	−0.8898
7	0.2685	3.40	0.226	123 20	8 13.3	249 53	16 39.5	0.4235	1.2772	7.72	0.8874
8	0.2712	3.26	0.217	122 36	8 10.4	248 50	16 35.3	0.4145	1.2777	7.67	0.8848
9	0.2740	3.16	0.211	122 10	8 8.7	247 48	16 31.2	0.4054	1.2781	7.62	0.8820
10	0.2767	3.09	0.206	122 1	8 8.1	246 45	16 27.0	0.3976	1.2786	7.57	0.8792
11	0.2794	−3.06	−0.204	122 2	8 8.1	245 43	16 22.9	+0.3922	+1.2790	−7.52	−0.8762
12	0.2822	3.04	0.202	122 1	8 8.1	244 40	16 18.7	0.3898	1.2795	7.47	0.8731
13	0.2849	3.03	0.202	121 50	8 7.3	243 38	16 14.5	0.3903	1.2800	7.41	0.8697
14	0.2877	3.00	0.200	121 17	8 5.1	242 36	16 10.4	0.3930	1.2805	7.35	0.8663
15	0.2904	2.94	0.196	120 19	8 1.3	241 35	16 6.3	0.3967	1.2811	7.29	0.8627
16	0.2931	−2.84	−0.190	118 58	7 55.9	240 33	16 2.2	+0.4002	+1.2816	−7.23	−0.8589
17	0.2959	2.71	0.180	117 16	7 49.1	239 32	15 58.1	0.4023	1.2822	7.16	0.8550
18	0.2986	2.53	0.169	115 21	7 41.4	238 31	15 54.1	0.4022	1.2827	7.09	0.8509
19	0.3013	2.34	0.156	113 23	7 33.5	237 30	15 50.0	0.3996	1.2833	7.03	0.8467
20	0.3041	2.14	0.142	111 29	7 25.9	236 29	15 45.9	0.3944	1.2839	6.96	0.8423
($14^{\rm h}.0$) 21	0.3068	−1.95	−0.130	109 48	7 19.2	235 28	15 41.9	+0.3871	+1.2845	−6.88	−0.8378
22	0.3096	1.79	0.119	108 27	7 13.8	234 28	15 37.9	0.3786	1.2851	6.81	0.8330
23	0.3123	1.66	0.111	107 28	7 9.9	233 28	15 33.9	0.3702	1.2857	6.73	0.8281
24	0.3150	1.58	0.105	106 48	7 7.2	232 28	15 29.9	0.3631	1.2863	6.65	0.8229
25	0.3178	1.53	0.102	106 25	7 5.7	231 28	15 25.9	0.3588	1.2869	6.57	0.8177
26	0.3205	−1.50	−0.100	106 8	7 4.5	230 28	15 21.9	+0.3578	+1.2875	−6.49	−0.8122
27	0.3232	1.48	0.099	105 45	7 3.0	229 29	15 17.9	0.3604	1.2882	6.41	0.8065
28	0.3260	1.44	0.096	105 8	7 0.5	228 30	15 14.0	0.3657	1.2888	6.32	0.8006
29	0.3287	1.37	0.092	104 10	6 56.7	227 31	15 10.1	0.3726	1.2894	6.23	0.7946
30	0.3315	1.27	0.085	102 49	6 51.3	226 32	15 6.1	0.3797	1.2900	6.14	0.7883
May 1	0.3342	−1.13	−0.075	101 9	6 44.6	225 34	15 2.3	+0.3855	+1.2907	−6.05	−0.7818
2	0.3369	0.96	0.064	99 17	6 37.1	224 35	14 58.3	0.3893	1.2913	5.96	0.7751
3	0.3397	0.77	0.051	97 19	6 29.3	223 37	14 54.5	0.3903	1.2920	5.86	0.7681
4	0.3424	0.58	0.039	95 24	6 21.6	222 39	14 50.6	0.3887	1.2926	5.77	0.7609
5	0.3452	0.40	0.027	93 39	6 14.6	221 41	14 46.7	0.3847	1.2932	5.67	0.7535
($15^{\rm h}.0$) 6	0.3479	−0.26	−0.017	92 10	6 8.7	220 44	14 42.9	+0.3792	+1.2939	−5.57	−0.7458
7	0.3506	0.15	0.010	91 2	6 4.1	219 46	14 39.1	0.3734	1.2945	5.47	0.7379
8	0.3534	0.07	0.005	90 13	6 0.9	218 49	14 35.3	0.3688	1.2951	5.37	0.7297
9	0.3561	−0.01	−0.001	89 38	5 58.5	217 52	14 31.5	0.3665	1.2957	5.26	0.7212
10	0.3588	+0.03	+0.002	89 9	5 56.6	216 55	14 27.7	0.3675	1.2963	5.16	0.7123
11	0.3616	+0.09	+0.006	88 35	5 54.3	215 59	14 23.9	+0.3719	+1.2969	−5.05	−0.7033
12	0.3643	0.17	0.011	87 46	5 51.1	215 2	14 20.1	0.3791	1.2975	4.94	0.6939
13	0.3671	0.28	0.019	86 37	5 46.5	214 6	14 16.4	0.3881	1.2981	4.83	0.6842
14	0.3698	0.44	0.029	85 7	5 40.5	213 10	14 12.7	0.3976	1.2987	4.72	0.6741
15	0.3725	0.64	0.043	83 17	5 33.1	212 14	14 8.9	0.4062	1.2992	4.61	0.6637
16	0.3753	+0.86	+0.058	81 11	5 24.7	211 18	14 5.2	+0.4132	+1.2998	−4.50	−0.6528
17	0.3780	+1.09	+0.073	79 0	5 16.0	210 23	14 1.5	+0.4178	+1.3004	−4.38	−0.6416

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	τ	f		G		H		Log g.	Log h.	i	Log i.
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	″	s	° ′	h m	° ′	h m			″	
May 17	0.3780	+1.09	+0.073	79 0	5 16.0	210 23	14 1.5	+0.4178	+1.3004	−4.38	−0.6416
18	0.3807	1.32	0.088	76 49	5 7.3	209 27	13 57.8	0.4199	1.3009	4.27	0.6300
19	0.3835	1.54	0.102	74 49	4 59.3	208 32	13 54.1	0.4198	1.3015	4.15	0.6179
20	0.3862	1.71	0.114	73 4	4 52.3	207 37	13 50.5	0.4181	1.3020	4.03	0.6054
(16^h.0) 21	0.3890	1.84	0.122	71 40	4 46.7	206 42	13 46.8	0.4158	1.3025	3.91	0.5924
22	0.3917	+1.93	+0.129	70 39	4 42.6	205 47	13 43.1	+0.4142	+1.3030	−3.79	−0.5788
23	0.3944	2.00	0.133	69 57	4 39.8	204 52	13 39.5	0.4142	1.3035	3.67	0.5647
24	0.3972	2.06	0.137	69 30	4 38.0	203 58	13 35.9	0.4169	1.3039	3.55	0.5500
25	0.3999	2.12	0.141	69 6	4 36.4	203 3	13 32.2	0.4224	1.3044	3.43	0.5346
26	0.4026	2.21	0.147	68 37	4 34.5	202 9	13 28.6	0.4305	1.3048	3.30	0.5186
27	0.4054	+2.34	+0.156	67 54	4 31.6	201 15	13 25.0	+0.4403	+1.3053	−3.18	−0.5018
28	0.4081	2.50	0.167	66 54	4 27.6	200 21	13 21.4	0.4507	1.3057	3.05	0.4843
29	0.4109	2.69	0.179	65 37	4 22.5	199 27	13 17.8	0.4605	1.3061	2.92	0.4658
30	0.4136	2.91	0.194	64 4	4 16.3	198 33	13 14.2	0.4688	1.3065	2.80	0.4465
31	0.4163	3.13	0.209	62 24	4 9.6	197 39	13 10.6	0.4749	1.3068	2.67	0.4261
June 1	0.4191	+3.34	+0.223	60 4	4 2.7	196 46	13 7.1	+0.4788	+1.3072	−2.54	−0.4046
2	0.4218	3.53	0.235	59 3	3 56.2	195 53	13 3.5	0.4805	1.3076	2.41	0.3819
3	0.4246	3.68	0.245	57 37	3 50.5	194 59	12 59.9	0.4807	1.3079	2.28	0.3578
4	0.4273	3.80	0.253	56 26	3 45.7	194 6	12 56.4	0.4803	1.3082	2.15	0.3320
5	0.4300	3.88	0.259	55 33	3 42.2	193 13	12 52.9	0.4802	1.3085	2.02	0.3046
(17^h.0) 6	0.4328	+3.96	+0.264	54 56	3 39.7	192 20	12 49.3	+0.4815	+1.3087	−1.89	−0.2753
7	0.4355	4.03	0.269	54 31	3 38.1	191 27	12 45.8	0.4850	1.3090	1.75	0.2436
8	0.4382	4.13	0.275	54 7	3 36.5	190 34	12 42.3	0.4912	1.3092	1.62	0.2093
9	0.4410	4.25	0.284	53 41	3 34.7	189 41	12 38.7	0.4995	1.3094	1.49	0.1720
10	0.4437	4.42	0.295	53 3	3 32.2	188 48	12 35.2	0.5096	1.3096	1.35	0.1316
11	0.4465	+4.63	+0.309	52 8	3 28.5	187 55	12 31.7	+0.5205	+1.3098	−1.22	−0.0862
12	0.4492	4.87	0.325	50 57	3 23.8	187 2	12 28.1	0.5310	1.3100	1.09	0.0355
13	0.4519	5.13	0.342	49 34	3 18.3	186 10	12 24.7	0.5403	1.3101	0.95	9.9780
14	0.4547	5.38	0.359	48 2	3 12.1	185 17	12 21.1	0.5479	1.3102	0.82	9.9116
15	0.4574	5.62	0.374	46 28	3 5.9	184 24	12 17.6	0.5535	1.3104	0.68	9.8330
16	0.4601	+5.82	+0.388	44 59	2 59.9	183 32	12 14.1	+0.5572	+1.3104	−0.55	−9.7370
17	0.4629	5.98	0.399	43 40	2 54.7	182 39	12 10.6	0.5593	1.3105	0.41	9.6132
18	0.4656	6.10	0.407	42 38	2 50.5	181 47	12 7.1	0.5605	1.3105	0.28	9.4392
19	0.4684	6.19	0.413	41 52	2 47.5	180 54	12 3.6	0.5615	1.3106	−0.14	9.1446
20	0.4711	6.27	0.418	41 23	2 45.5	180 2	12 0.1	0.5635	1.3106	0.00	−7.5911
(18^h.0) 21	0.4738	+6.34	+0.423	41 6	2 44.4	179 9	11 56.6	+0.5668	+1.3106	+0.13	+9.1193
22	0.4766	6.44	0.429	40 54	2 43.6	178 17	11 53.1	0.5720	1.3106	0.27	9.4267
23	0.4793	6.56	0.438	40 41	2 42.7	177 24	11 49.6	0.5789	1.3105	0.40	9.6047
24	0.4820	6.73	0.448	40 20	2 41.3	176 32	11 46.1	0.5871	1.3105	0.54	9.7305
25	0.4848	6.92	0.461	39 47	2 39.1	175 39	11 42.6	0.5959	1.3104	0.67	9.8278
26	0.4875	+7.14	+0.476	38 59	2 35.9	174 46	11 39.1	+0.6044	+1.3102	+0.81	+9.9070
27	0.4903	7.37	0.491	37 59	2 31.9	173 54	11 35.6	0.6121	1.3101	0.94	9.9741
28	0.4930	7.59	0.506	36 50	2 27.3	173 1	11 32.1	0.6182	1.3100	1.08	0.0320
29	0.4957	7.79	0.519	35 38	2 22.5	172 9	11 28.6	0.6227	1.3098	1.21	0.0830
30	0.4985	7.96	0.531	34 28	2 17.9	171 16	11 25.1	0.6257	1.3097	1.35	0.1286
31	0.5012	+8.09	+0.539	33 27	2 13.8	170 23	11 21.5	+0.6274	+1.3095	+1.48	+0.1695
32	0.5040	+8.19	+0.546	32 37	2 10.5	169 31	11 18.1	+0.6284	+1.3092	+1.61	+0.2068

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)		τ	*f*		*G*		*H*		Log *g*.	Log *h*.	*i*	Log *i*.
			In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
		y	″	s	° ′	h m	° ′	h m			″	
July	1	0.5012	+ 8.09	+0.539	33 27	2 13.8	170 23	11 21.5	+0.6274	+1.3095	+1.48	+0.1695
	2	0.5040	8.19	0.546	32 37	2 10.5	169 31	11 18.1	0.6284	1.3092	1.61	0.2068
	3	0.5067	8.26	0.551	32 0	2 8.0	168 38	11 14.5	0.6295	1.3090	1.74	0.2411
	4	0.5094	8.33	0.555	31 37	2 6.5	167 45	11 11.0	0.6314	1.3088	1.88	0.2730
	5	0.5122	8.42	0.561	31 23	2 5.5	166 52	11 7.5	0.6348	1.3085	2.01	0.3025
(19^h.0)	6	0.5149	+ 8.53	+0.569	31 13	2 4.9	165 59	11 3.9	+0.6398	+1.3082	+2.14	+0.3300
	7	0.5176	8.68	0.579	31 2	2 4.1	165 6	11 0.4	0.6465	1.3079	2.27	0.3557
	8	0.5204	8.87	0.592	30 42	2 2.8	164 13	10 56.9	0.6544	1.3076	2.40	0.3798
	9	0.5231	9.10	0.606	30 11	2 0.7	163 19	10 53.3	0.6629	1.3073	2.53	0.4026
	10	0.5259	9.35	0.623	29 27	1 57.8	162 26	10 49.7	0.6713	1.3069	2.66	0.4241
	11	0.5286	+ 9.60	+0.640	28 33	1 54.2	161 32	10 46.1	+0.6789	+1.3065	+2.78	+0.4445
	12	0.5313	9.83	0.655	27 32	1 50.1	160 39	10 42.6	0.6852	1.3062	2.91	0.4639
	13	0.5341	10.03	0.669	26 29	1 45.9	159 45	10 39.0	0.6900	1.3058	3.04	0.4823
	14	0.5368	10.20	0.680	25 28	1 41.9	158 51	10 35.4	0.6933	1.3053	3.16	0.4998
	15	0.5395	10.32	0.688	24 35	1 38.3	157 58	10 31.9	0.6954	1.3049	3.29	0.5165
	16	0.5423	+10.41	+0.694	23 54	1 35.6	157 4	10 28.3	+0.6967	+1.3045	+3.41	+0.5325
	17	0.5450	10.47	0.698	23 25	1 33.7	156 10	10 24.7	0.6978	1.3040	3.53	0.5479
	18	0.5478	10.53	0.702	23 9	1 32.6	155 16	10 21.1	0.6994	1.3036	3.65	0.5627
	19	0.5505	10.61	0.707	23 1	1 32.1	154 21	10 17.4	0.7019	1.3031	3.77	0.5768
	20	0.5532	10.70	0.714	22 58	1 31.9	153 27	10 13.8	0.7057	1.3026	3.89	0.5903
(20^h.0)	21	0.5560	+10.84	+0.722	22 53	1 31.5	152 32	10 10.1	+0.7108	+1.3021	+4.01	+0.6034
	22	0.5587	11.00	0.734	22 41	1 30.7	151 37	10 6.5	0.7168	1.3016	4.13	0.6159
	23	0.5614	11.20	0.746	22 20	1 29.3	150 42	10 2.8	0.7232	1.3010	4.25	0.6280
	24	0.5642	11.41	0.760	21 47	1 27.1	149 47	9 59.1	0.7295	1.3005	4.36	0.6396
	25	0.5669	11.61	0.774	21 5	1 24.3	148 52	9 55.5	0.7351	1.2999	4.48	0.6508
	26	0.5697	+11.80	+0.786	20 16	1 21.1	147 57	9 51.8	+0.7396	+1.2994	+4.59	+0.6616
	27	0.5724	11.95	0.797	19 25	1 17.7	147 2	9 48.1	0.7429	1.2988	4.70	0.6721
	28	0.5751	12.07	0.804	18 36	1 14.4	146 6	9 44.4	0.7450	1.2982	4.81	0.6821
	29	0.5779	12.15	0.810	17 54	1 11.6	145 10	9 40.7	0.7462	1.2976	4.92	0.6919
	30	0.5806	12.20	0.814	17 21	1 9.4	144 14	9 36.9	0.7468	1.2971	5.03	0.7013
	31	0.5834	+12.25	+0.817	17 0	1 8.0	143 18	9 33.2	+0.7476	+1.2965	+5.13	+0.7103
Aug.	1	0.5861	12.30	0.820	16 49	1 7.3	142 22	9 29.5	0.7490	1.2959	5.24	0.7191
	2	0.5888	12.38	0.825	16 45	1 7.0	141 25	9 25.7	0.7514	1.2952	5.34	0.7276
	3	0.5916	12.49	0.832	16 44	1 6.9	140 28	9 21.9	0.7552	1.2946	5.44	0.7358
	4	0.5943	12.64	0.842	16 40	1 6.7	139 32	9 18.1	0.7602	1.2940	5.54	0.7438
(21^h.0)	5	0.5970	+12.82	+0.855	16 30	1 6.0	138 35	9 14.3	+0.7662	+1.2934	+5.64	+0.7514
	6	0.5998	13.03	0.869	16 10	1 4.7	137 37	9 10.5	0.7725	1.2928	5.74	0.7588
	7	0.6025	13.25	0.884	15 41	1 2.7	136 40	9 6.7	0.7788	1.2922	5.84	0.7661
	8	0.6053	13.47	0.898	15 3	1 0.2	135 43	9 2.9	0.7843	1.2915	5.93	0.7730
	9	0.6080	13.65	0.910	14 20	0 57.3	134 45	8 59.0	0.7888	1.2909	6.02	0.7797
	10	0.6107	+13.80	+0.920	13 35	0 54.3	133 47	8 55.1	+0.7920	+1.2903	+6.11	+0.7862
	11	0.6135	13.90	0.927	12 54	0 51.6	132 49	8 51.3	0.7941	1.2896	6.20	0.7925
	12	0.6162	13.97	0.933	12 20	0 49.3	131 50	8 47.3	0.7951	1.2890	6.29	0.7986
	13	0.6189	14.01	0.934	11 55	0 47.7	130 52	8 43.5	0.7957	1.2884	6.37	0.8044
	14	0.6217	14.03	0.936	11 41	0 46.7	129 53	8 39.5	0.7961	1.2878	6.46	0.8102
	15	0.6244	+14.07	+0.938	11 36	0 46.4	128 54	8 35.6	+0.7971	+1.2871	+6.54	+0.8157
	16	0.6272	+14.12	+0.942	11 38	0 46.5	127 55	8 31.7	+0.7989	+1.2865	+6.62	+0.8210

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	τ	f		G		H		Log g.	Log h.	i	Log i.
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	″	s	° ′	h m	° ′	h m			″	
Aug. 16	0.6272	+14.12	+0.942	11 38	0 46.5	127 55	8 31.7	+0.7989	+1.2865	+6.62	+0.8210
17	0.6299	14.21	0.947	11 41	0 46.7	126 56	8 27.7	0.8016	1.2859	6.70	0.8261
18	0.6326	14.34	0.956	11 42	0 46.8	125 56	8 23.7	0.8054	1.2853	6.78	0.8310
19	0.6354	14.49	0.966	11 36	0 46.4	124 57	8 19.8	0.8099	1.2847	6.85	0.8358
20	0.6381	14.66	0.977	11 22	0 45.5	123 57	8 15.8	0.8147	1.2841	6.92	0.8404
($22^{h}.0$) 21	0.6408	+14.84	+0.989	10 59	0 43.9	122 57	8 11.8	+0.8193	+1.2836	+7.00	+0.8448
22	0.0436	15.00	1.000	10 29	0 41.9	121 57	8 7.8	0.8231	1.2830	7.06	0.8491
23	0.6463	15.13	1.009	9 53	0 39.5	120 56	8 3.7	0.8262	1.2824	7.13	0.8532
24	0.6491	15.23	1.015	9 17	0 37.1	119 56	7 59.7	0.8281	1.2819	7.20	0.8572
25	0.6518	15.28	1.019	8 45	0 35.0	118 55	7 55.7	0.8292	1.2813	7.26	0.8609
26	0.6545	+15.31	+1.021	8 19	0 33.3	117 54	7 51.6	+0.8294	+1.2808	+7.32	+0.8646
27	0.6573	15.33	1.022	8 2	0 32.1	116 53	7 47.5	0.8295	1.2803	7.38	0.8680
28	0.6600	15.34	1.023	7 55	0 31.7	115 52	7 43.5	0.8298	1.2798	7.44	0.8713
29	0.6628	15.37	1.025	7 55	0 31.7	114 50	7 39.4	0.8308	1.2793	7.49	0.8746
30	0.6655	15.44	1.029	8 1	0 32.1	113 49	7 35.3	0.8327	1.2788	7.54	0.8776
31	0.6682	+15.55	+1.036	8 8	0 32.5	112 47	7 31.1	+0.8358	+1.2784	+7.59	+0.8805
Sept. 1	0.6710	15.69	1.046	8 11	0 32.7	111 45	7 27.0	0.8398	1.2779	7.64	0.8832
2	0.6737	15.86	1.058	8 7	0 32.5	110 43	7 22.9	0.8445	1.2775	7.69	0.8858
3	0.6764	16.05	1.070	7 55	0 31.7	109 41	7 18.7	0.8495	1.2771	7.73	0.8884
4	0.6792	16.24	1.082	7 36	0 30.4	108 38	7 14.5	0.8541	1.2767	7.78	0.8907
($23^{h}.0$) 5	0.6819	+16.40	+1.094	7 9	0 28.6	107 36	7 10.4	+0.8581	+1.2763	+7.82	+0.8929
6	0.6847	16.54	1.102	6 40	0 26.7	106 33	7 6.2	0.8611	1.2759	7.85	0.8950
7	0.6874	16.63	1.108	6 11	0 24.7	105 30	7 2.0	0.8631	1.2756	7.89	0.8969
8	0.6901	16.68	1.112	5 46	0 23.1	104 27	6 57.8	0.8641	1.2753	7.92	0.8988
9	0.6929	16.70	1.114	5 28	0 21.9	103 24	6 53.6	0.8644	1.2750	7.95	0.9004
10	0.6956	+16.71	+1.114	5 18	0 21.2	102 21	6 49.4	+0.8645	+1.2747	+7.98	+0.9020
11	0.6983	16.71	1.114	5 18	0 21.2	101 18	6 45.2	0.8646	1.2745	8.01	0.9034
12	0.7011	16.73	1.116	5 25	0 21.7	100 15	6 41.0	0.8653	1.2742	8.03	0.9046
13	0.7038	16.79	1.119	5 35	0 22.3	99 11	6 36.7	0.8668	1.2740	8.05	0.9058
14	0.7066	16.88	1.125	5 45	0 23.0	98 8	6 32.5	0.8692	1.2738	8.07	0.9069
15	0.7093	+17.00	+1.134	5 52	0 23.5	97 4	6 28.3	+0.8725	+1.2737	+8.09	+0.9078
16	0.7120	17.15	1.143	5 52	0 23.5	96 0	6 24.0	0.8762	1.2735	8.10	0.9086
17	0.7148	17.31	1.154	5 44	0 22.9	94 57	6 19.8	0.8801	1.2734	8.11	0.9092
18	0.7175	17.46	1.164	5 28	0 21.9	93 53	6 15.5	0.8836	1.2733	8.12	0.9098
19	0.7202	17.58	1.172	5 8	0 20.5	92 49	6 11.3	0.8864	1.2732	8.13	0.9101
($0^{h}.0$) 20	0.7230	+17.67	+1.178	4 44	0 18.9	91 45	6 7.0	+0.8884	+1.2732	+8.14	+0.9104
21	0.7257	17.72	1.181	4 22	0 17.5	90 41	6 2.7	0.8895	1.2731	8.14	0.9106
22	0.7285	17.74	1.183	4 5	0 16.3	89 36	5 58.4	0.8898	1.2731	8.14	0.9105
23	0.7312	17.74	1.183	3 54	0 15.6	88 32	5 54.1	0.8898	1.2732	8.14	0.9104
24	0.7339	17.74	1.183	3 52	0 15.5	87 28	5 49.9	0.8897	1.2732	8.13	0.9102
25	0.7367	+17.76	+1.184	3 58	0 15.9	86 24	5 45.6	+0.8900	+1.2733	+8.13	+0.9098
26	0.7394	17.80	1.187	4 10	0 16.7	85 20	5 41.3	0.8912	1.2733	8.12	0.9094
27	0.7421	17.88	1.192	4 24	0 17.6	84 16	5 37.1	0.8934	1.2735	8.10	0.9087
28	0.7449	18.00	1.200	4 37	0 18.5	83 12	5 32.8	0.8965	1.2736	8.09	0.9079
29	0.7476	18.16	1.211	4 45	0 19.0	82 8	5 28.5	0.9003	1.2738	8.07	0.9071
30	0.7504	+18.34	+1.223	4 46	0 19.1	81 3	5 24.2	+0.9047	+1.2740	+8.06	+0.9061
31	0.7531	+18.53	+1.235	4 40	0 18.7	79 59	5 19.9	+0.9090	+1.2742	+8.04	+0.9050

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	τ	*f*		*G*		*H*		Log *g*.	Log *h*.	*i*	Log *i*.
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	″	s	° ′	h m	° ′	h m			″	
Oct. 1	0.7531	+18.53	+1.235	4 40	0 18.7	79 59	5 19.9	+0.9090	+1.2742	+8.04	+0.9050
2	0.7558	18.70	1.246	4 27	0 17.8	78 55	5 15.7	0.9127	1.2744	8.01	0.9037
3	0.7586	18.84	1.256	4 10	0 16.7	77 51	5 11.4	0.9158	1.2747	7.99	0.9023
4	0.7613	18.94	1.263	3 51	0 15.4	76 47	5 7.1	0.9182	1.2749	7.96	0.9007
(1^{h}.●) 5	0.7641	19.01	1.267	3 35	0 14.3	75 43	5 2.9	0.9195	1.2752	7.93	0.8990
6	0.7668	+19.04	+1.269	3 25	0 13.7	74 39	4 58.6	+0.9200	+1.2756	+7.89	+0.8972
7	0.7695	19.05	1.270	3 21	0 13.4	73 35	4 54.3	0.9202	1.2759	7.86	0.8952
8	0.7723	19.06	1.270	3 25	0 13.7	72 31	4 50.1	0.9204	1.2763	7.82	0.8931
9	0.7750	19.08	1.272	3 36	0 14.4	71 28	4 45.9	0.9211	1.2766	7.78	0.8909
10	0.7777	19.13	1.275	3 52	0 15.5	70 24	4 41.6	0.9223	1.2770	7.74	0.8885
11	0.7805	+19.22	+1.281	4 8	0 16.5	69 21	4 37.4	+0.9244	+1.2774	+7.69	+0.8860
12	0.7832	19.34	1.289	4 23	0 17.5	68 17	4 33.1	0.9274	1.2779	7.64	0.8833
13	0.7860	19.49	1.299	4 32	0 18.1	67 14	4 28.9	0.9308	1.2783	7.59	0.8805
14	0.7887	19.66	1.310	4 34	0 18.3	66 10	4 24.7	0.9345	1.2788	7.54	0.8775
15	0.7914	19.82	1.321	4 29	0 17.9	65 7	4 20.5	0.9380	1.2793	7.49	0.8745
16	0.7942	+19.97	+1.331	4 19	0 17.3	64 4	4 16.3	+0.9411	+1.2798	+7.43	+0.8711
17	0.7969	20.08	1.339	4 5	0 16.3	63 1	4 12.1	0.9436	1.2803	7.37	0.8677
18	0.7996	20.17	1.344	3 51	0 15.4	61 59	4 7.9	0.9451	1.2809	7.31	0.8641
19	0.8024	20.21	1.347	3 40	0 14.7	60 56	4 3.7	0.9460	1.2814	7.25	0.8604
20	0.8051	20.24	1.349	3 34	0 14.3	59 53	3 59.5	0.9466	1.2820	7.18	0.8564
(2^{h}.●) 21	0.8079	+20.25	+1.350	3 36	0 14.4	58 51	3 55.4	+0.9469	+1.2825	+7.12	+0.8523
22	0.8106	20.28	1.352	3 44	0 14.9	57 48	3 51.2	0.9476	1.2831	7.05	0.8480
23	0.8133	20.33	1.355	3 59	0 15.9	56 46	3 47.1	0.9488	1.2837	6.98	0.8436
24	0.8161	20.42	1.361	4 16	0 17.1	55 44	3 42.9	0.9509	1.2843	6.90	0.8390
25	0.8188	20.55	1.370	4 33	0 18.2	54 42	3 38.8	0.9539	1.2849	6.83	0.8341
26	0.8215	+20.73	+1.382	4 46	0 19.1	53 40	3 34.7	+0.9576	+1.2856	+6.75	+0.8291
27	0.8243	20.93	1.395	4 54	0 19.6	52 39	3 30.6	0.9619	1.2862	6.67	0.8239
28	0.8270	21.14	1.409	4 55	0 19.7	51 37	3 26.5	0.9663	1.2868	6.58	0.8185
29	0.8298	21.34	1.423	4 49	0 19.3	50 36	3 22.4	0.9704	1.2875	6.50	0.8129
30	0.8325	21.53	1.435	4 39	0 18.6	49 35	3 18.3	0.9740	1.2881	6.41	0.8070
31	0.8352	+21.67	+1.445	4 27	0 17.8	48 34	3 14.3	+0.9768	+1.2887	+6.32	+0.8010
Nov. 1	0.8380	21.78	1.452	4 15	0 17.0	47 33	3 10.2	0.9788	1.2894	6.23	0.7948
2	0.8407	21.85	1.457	4 7	0 16.5	46 32	3 6.1	0.9801	1.2900	6.14	0.7883
3	0.8435	21.90	1.460	4 5	0 16.3	45 31	3 2.1	0.9810	1.2907	6.05	0.7815
4	0.8462	21.94	1.463	4 9	0 16.6	44 31	2 58.1	0.9819	1.2914	5.95	0.7745
(3^{h}.●) 5	0.8489	+21.99	+1.466	4 20	0 17.3	43 31	2 54.1	+0.9830	+1.2920	+5.85	+0.7673
6	0.8517	22.06	1.471	4 35	0 18.3	42 31	2 50.1	0.9846	1.2927	5.75	0.7599
7	0.8544	22.17	1.478	4 52	0 19.5	41 31	2 46.1	0.9869	1.2933	5.65	0.7521
8	0.8571	22.32	1.488	5 7	0 20.5	40 31	2 42.1	0.9900	1.2940	5.55	0.7441
9	0.8599	22.50	1.500	5 18	0 21.2	39 31	2 38.1	0.9936	1.2946	5.44	0.7358
10	0.8626	+22.70	+1.513	5 23	0 21.5	38 32	2 34.1	+0.9975	+1.2953	+5.33	+0.7271
11	0.8654	22.91	1.527	5 22	0 21.5	37 32	2 30.1	1.0014	1.2959	5.23	0.7182
12	0.8681	23.10	1.540	5 15	0 21.0	36 33	2 26.2	1.0049	1.2966	5.12	0.7089
13	0.8708	23.26	1.551	5 5	0 20.3	35 34	2 22.3	1.0078	1.2972	5.00	0.6992
14	0.8736	23.39	1.559	4 53	0 19.5	34 35	2 18.3	1.0101	1.2978	4.89	0.6892
15	0.8763	+23.48	+1.566	4 43	0 18.9	33 36	2 14.4	+1.0117	+1.2984	+4.77	+0.6788
16	0.8790	+23.55	+1.570	4 37	0 18.5	32 37	2 10.5	+1.0129	+1.2990	+4.66	+0.6681

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	τ	f		G		H		Log g.	Log h.	i	Log i.
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	″	s	° ′	h m	° ′	h m			″	
Nov. 16	0.8790	+23.55	+1.570	4 37	0 18.5	32 37	2 10.5	+1.0129	+1.2990	+4.66	+0.6681
17	0.8818	23.61	1.574	4 36	0 18.4	31 39	2 6.6	1.0139	1.2996	4.54	0.6569
18	0.8845	23.67	1.578	4 42	0 18.8	30 41	2 2.7	1.0151	1.3002	4.42	0.6453
19	0.8873	23.75	1.583	4 52	0 19.5	29 42	1 58.8	1.0166	1.3008	4.30	0.6332
$(4^{\mathrm{h}}.0)$ 20	0.8900	23.86	1.591	5 6	0 20.4	28 44	1 54.9	1.0189	1.3014	4.18	0.6207
21	0.8927	+24.02	+1.602	5 20	0 21.3	27 46	1 51.1	+1.0220	+1.3019	+4.05	+0.6076
22	0.8955	24.22	1.615	5 31	0 22.1	26 48	1 47.2	1.0257	1.3024	3.93	0.5939
23	0.8982	24.45	1.630	5 38	0 22.5	25 51	1 43.4	1.0299	1.3030	3.80	0.5797
24	0.9009	24.70	1.647	5 39	0 22.6	24 53	1 39.5	1.0343	1.3035	3.67	0.5648
25	0.9037	24.95	1.663	5 34	0 22.3	23 56	1 35.7	1.0385	1.3040	3.54	0.5493
26	0.9064	+25.18	+1.679	5 24	0 21.6	22 58	1 31.9	+1.0424	+1.3045	+3.41	+0.5331
27	0.9092	25.38	1.692	5 12	0 20.8	22 1	1 28.1	1.0456	1.3049	3.28	0.5161
28	0.9119	25.53	1.702	4 59	0 19.9	21 4	1 24.3	1.0482	1.3054	3.15	0.4982
29	0.9146	25.65	1.710	4 49	0 19.3	20 6	1 20.4	1.0501	1.3058	3.02	0.4795
30	0.9174	25.75	1.716	4 43	0 18.9	19 9	1 16.6	1.0516	1.3062	2.88	0.4597
Dec. 1	0.9201	+25.83	+1.722	4 43	0 18.9	18 12	1 12.8	+1.0529	+1.3066	+2.75	+0.4389
2	0.9229	25.91	1.727	4 48	0 19.2	17 16	1 9.1	1.0543	1.3070	2.61	0.4168
3	0.9256	26.01	1.734	4 56	0 19.7	16 19	1 5.3	1.0561	1.3074	2.47	0.3934
4	0.9283	26.14	1.743	5 7	0 20.5	15 22	1 1.5	1.0585	1.3077	2.34	0.3685
$(5^{\mathrm{h}}.0)$ 5	0.9311	26.31	1.754	5 18	0 21.2	14 26	0 57.7	1.0614	1.3081	2.20	0.3418
6	0.9338	+26.52	+1.768	5 25	0 21.7	13 29	0 53.9	+1.0649	+1.3084	+2.06	+0.3133
7	0.9365	26.75	1.783	5 28	0 21.9	12 33	0 50.2	1.0686	1.3087	1.92	0.2829
8	0.9393	26.98	1.799	5 25	0 21.7	11 36	0 46.4	1.0724	1.3089	1.78	0.2499
9	0.9420	27.21	1.814	5 17	0 21.1	10 40	0 42.7	1.0759	1.3092	1.64	0.2141
10	0.9448	27.42	1.828	5 5	0 20.3	9 44	0 38.9	1.0790	1.3094	1.50	0.1747
11	0.9475	+27.59	+1.839	4 51	0 19.4	8 47	0 35.1	+1.0816	+1.3096	+1.35	+0.1313
12	0.9502	27.72	1.848	4 38	0 18.5	7 51	0 31.4	1.0836	1.3098	1.21	0.0828
13	0.9530	27.82	1.855	4 28	0 17.9	6 55	0 27.7	1.0850	1.3100	1.07	0.0282
14	0.9557	27.91	1.860	4 22	0 17.5	5 59	0 23.9	1.0863	1.3101	0.92	9.9652
15	0.9584	27.99	1.866	4 20	0 17.3	5 3	0 20.2	1.0874	1.3103	0.78	9.8917
16	0.9612	+28.08	+1.872	4 24	0 17.6	4 6	0 16.4	+1.0890	+1.3104	+0.64	+9.8030
17	0.9639	28.21	1.881	4 30	0 18.0	3 10	0 12.7	1.0910	1.3105	0.49	9.6911
18	0.9667	28.37	1.892	4 38	0 18.5	2 14	0 8.9	1.0936	1.3105	0.35	9.5397
19	0.9694	28.58	1.905	4 44	0 18.9	1 18	0 5.2	1.0969	1.3106	0.20	9.3051
20	0.9721	28.83	1.922	4 47	0 19.1	0 22	0 1.5	1.1006	1.3106	+0.06	+8.7589
$(6^{\mathrm{h}}.0)$ 21	0.9749	+29.09	+1.939	4 46	0 19.1	359 26	23 57.7	+1.1045	+1.3106	−0.09	−8.9415
22	0.9776	29.36	1.957	4 39	0 18.6	358 30	23 54.0	1.1084	1.3106	0.23	9.3657
23	0.9803	29.61	1.974	4 28	0 17.9	357 34	23 50.3	1.1120	1.3105	0.38	9.5760
24	0.9831	29.83	1.989	4 13	0 16.9	356 38	23 46.5	1.1151	1.3104	0.52	9.7171
25	0.9858	30.02	2.001	3 58	0 15.9	355 42	23 42.8	1.1177	1.3104	0.67	9.8232
26	0.9886	+30.16	+2.011	3 44	0 14.9	354 46	23 39.1	+1.1196	+1.3103	−0.81	−9.9084
27	0.9913	30.27	2.018	3 33	0 14.2	353 49	23 35.3	1.1212	1.3101	0.95	9.9794
28	0.9940	30.37	2.024	3 27	0 13.8	352 53	23 31.5	1.1224	1.3100	1.10	0.0404
29	0.9968	30.45	2.030	3 25	0 13.7	351 57	23 27.8	1.1236	1.3098	1.24	0.0937
30	0.9995	30.56	2.037	3 27	0 13.8	351 1	23 24.1	1.1251	1.3096	1.38	0.1410
31	1.0023	+30.68	+2.046	3 32	0 14.1	350 4	23 20.3	+1.1270	+1.3094	−1.53	−0.1836
32	1.0050	+30.85	+2.057	3 37	0 14.5	349 8	23 16.5	+1.1293	+1.3091	−1.67	−0.2222

MEAN PLACES FOR 1889.0. (January 0^d.0—0^d.562, Washington.)

Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
α Andromedæ	2.0	0 2 39.025	+ 3.0913	+ 28 28 39.19	+ 19.885
* β Cassiopeæ	2.0	0 3 15.424	3.1739	+ 58 32 13.96	19.852
* 22 Andromedæ	5.3	0 4 33.178	3.1022	+ 45 27 15.65	20.036
4 Draconis (H.) S. P.	4.7	0 6 59.905	2.8865	+ 101 46 1.00	20.022
γ Pegasi (*Algenib*)	2.7	0 7 31.204	3.0836	+ 14 33 59.02	20.024
* σ Andromedæ	4.3	0 12 31.797	+ 3.1229	+ 36 10 10.96	+ 19.984
* ι Ceti	3.3	0 13 46.175	3.0528	− 9 26 22.46	19.958
* 6 Ursæ Minoris S. P.	6.0	0 14 20.274	0.1510	+ 91 41 4.63	19.941
* 44 Piscium	6.0	0 19 42.737	3.0732	+ 1 19 29.67	19.955
β Hydri	3.0	0 19 54.315	3.2318	− 77 52 46.08	20.284
12 Ceti	6.0	0 24 22.427	+ 3.0618	− 4 34 14.41	+ 19.938
κ Draconis S. P.	3.3	0 28 44.633	2.5921	+ 109 35 59.67	19.890
* π Andromedæ	4.0	0 30 57.146	3.1905	+ 33 6 29.27	19.872
α Cassiopeæ (*var.*)	2.5	0 34 12.677	3.3735	+ 55 55 42.24	19.789
β Ceti	2.0	0 38 1.078	3.0143	− 18 35 45.92	19.802
21 Cassiopeæ	6.0	0 38 19.363	+ 3.8568	+ 74 22 52.32	+ 19.753
* ο Cassiopeæ	5.0	0 38 32.427	3.3190	+ 47 40 35.97	19.755
* δ Piscium	4.3	0 42 55.382	3.1073	+ 6 58 50.83	19.650
32^2 Camelop. (H.) S. P.	4.7	0 48 19.066	0.3918	+ 95 59 1.64	19.596
* γ Cassiopeæ	2.0	0 50 0.703	3.5786	+ 60 6 55.40	19.564
* μ Andromedæ	4.0	0 50 35.545	+ 3.3109	+ 37 53 49.88	+ 19.618
* 43 Cephei (H.)	4.3	0 53 40.963	7.2289	+ 85 39 40.51	19.505
ε Piscium	4.0	0 57 10.930	3.1090	+ 7 17 32.42	19.455
β Andromedæ	2.3	1 3 31.081	3.3441	+ 35 1 54.55	19.166
* κ Tucanæ	5.0	1 12 0.355	2.0553	− 69 27 56.33	19.171
* f Piscium	5.0	1 12 4.372	+ 3.0896	+ 3 1 46.70	+ 19.036
α Ursæ Minoris (*Polaris*)	2.0	1 18 7.893	23.1540	+ 88 42 59.50	18.898
θ^1 Ceti	3.0	1 18 28.492	2.9970	− 8 45 22.82	18.669
38 Cassiopeæ	6.3	1 22 58.550	4.3771	+ 69 41 34.60	18.678
* κ Octantis S. P.	5.0	1 23 6.885	8.7381	− 94 47 1.14	18.750
η Piscium	3.7	1 25 32.621	+ 3.2025	+ 14 46 24.13	+ 18.665
* υ Andromedæ	4.0	1 30 17.022	3.5041	+ 40 51 0.41	18.147
* π Piscium	5.7	1 31 12.835	3.1704	+ 11 34 24.83	18.528
α Eridani (*Achernar*)	1.0	1 33 34.463	2.2324	− 57 48 3.17	18.358
* ν Piscium	4.7	1 35 39.293	3.1178	+ 4 55 32.28	18.331
ο Piscium	4.3	1 39 31.933	+ 3.1622	+ 8 35 55.06	+ 18.218
* ζ Ceti	3.0	1 45 58.884	2.9618	− 10 53 4.78	17.825
β Arietis	3.0	1 48 30.485	3.3035	+ 20 15 54.37	17.729
50 Cassiopeæ	4.0	1 53 57.831	5.0104	+ 71 53 1.26	17.648
* γ Andromedæ	2.3	1 57 5.188	3.6602	+ 41 47 47.95	17.444
α Arietis	2.0	2 0 54.976	+ 3.3709	+ 22 56 13.86	+ 17.175
α Draconis S. P.	3.3	2 1 23.106	1.6237	+ 115 5 36.99	17.300
* β Trianguli	3.0	2 2 56.377	3.5544	+ 34 27 42.64	17.206
ξ^1 Ceti	4.3	2 7 7.013	+ 3.1740	+ 8 19 32.23	17.032
* 4 Ursæ Minoris S. P.	5.0	2 9 17.346	− 0.3234	+ 101 55 51.04	16.907
* γ Trianguli	4.3	2 10 42.956	+ 3.5508	+ 33 20 0.34	+ 16.847
* 67 Ceti	6.0	2 11 26.780	2.9893	− 6 56 2.97	16.734
* δ Hydri	4.0	2 19 46.561	1.0546	− 69 9 52.40	16.451
ι Cassiopeæ	4.0	2 19 55.288	4.8616	+ 66 54 9.76	16.435
ξ^2 Ceti	4.0	2 22 15.455	+ 3.1837	+ 7 57 43.44	+ 16.297

* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

MEAN PLACES FOR 1889.0. (January $0^d.0$—$0^d.562$, Washington.)

Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
5 Ursæ Minoris . S. P.	4.7	2 27 45.989	− 0.1908	+103 48 38.14	+16.011
* δ Ceti	4.0	2 33 47.597	+ 3.0727	− 0 9 3.35	15.698
* μ Hydri	6.0	2 34 1.987	− 1.4365	− 79 35 35.92	15.681
* θ Persei	4.0	2 36 37.200	+ 4.0695	+ 48 45 29.96	15.460
γ Ceti	3.3	2 37 32.923	3.1032	+ 2 46 3.22	15.341
* σ Arietis	5.7	2 45 21.856	+ 3.3045	+ 14 37 26.77	+15.010
β Ursæ Minoris . S. P.	2.0	2 51 2.057	− 0.2315	+105 23 27.23	14.719
* 47 Cephei (H.)	6.0	2 51 21.107	+ 7.7197	+ 78 58 43.46	14.700
* ε Arietis	4.3	2 52 51.908	3.4210	+ 20 53 45.30	14.608
α Ceti	2.3	2 56 28.609	3.1303	+ 3 39 13.54	14.311
* β Persei (*Algol*) (*var.*)	2.7	3 0 56.812	+ 3.8835	+ 40 31 38.19	+14.123
48 Cephei (H.)	6.3	3 6 15.292	7.4054	+ 77 19 32.25	13.735
ζ Arietis	4.7	3 8 31.275	3.4393	+ 20 37 57.04	13.559
α Persei	2.0	3 16 24.003	4.2573	+ 49 27 55.23	13.096
* ρ Octantis . S. P.	6.0	3 17 47.895	+12.9719	− 95 54 25.90	12.992
* ι Hydri	5.0	3 18 44.268	− 1.5993	− 77 47 36.44	+13.025
γ^3 Ursæ Minoris . S. P.	3.0	3 20 54.544	− 0.1340	+107 46 15.73	12.811
* *f* Tauri	4.0	3 24 44.660	+ 3.3048	+ 12 33 20.64	12.566
ε Eridani	3.0	3 27 42.037	2.8236	− 9 50 3.39	12.395
δ Persei	3.3	3 35 1.401	4.2498	+ 47 25 54.36	11.813
* γ Camelopardalis (H.)	4.3	3 38 38.882	+ 6.2377	+ 70 59 20.44	+11.549
η Tauri	3.0	3 40 53.153	3.5568	+ 23 45 40.29	11.383
ζ Persei	3.0	3 47 9.294	+ 3.7601	+ 31 33 11.34	10.952
ζ Ursæ Minoris . S. P.	4.3	3 48 2.193	− 2.2523	+101 51 51.85	10.920
* γ Hydri	3.3	3 48 57.751	− 0.9970	− 74 34 44.22	10.981
* ε Persei	3.3	3 50 24.282	+ 4.0098	+ 39 41 17.80	+10.725
γ Eridani	3.0	3 52 51.072	2.7985	− 13 49 29.39	10.448
* A^1 Tauri	4.7	3 58 7.997	3.5399	+ 21 46 39.74	10.086
* *c* Persei	4.0	4 0 36.234	4.3369	+ 47 24 54.79	9.943
Groombr. 2320 . S. P.	6.3	4 6 1.043	0.1396	+111 53 50.36	9.498
* o^1 Eridani	4.3	4 6 26.824	+ 2.9267	− 7 7 39.64	+ 9.619
γ Tauri	4.0	4 13 28.600	+ 3.4089	+ 15 21 32.12	8.961
* η Ursæ Minoris . S. P.	5.0	4 20 45.290	− 1.8169	+103 59 20.87	8.161
ε Tauri	3.7	4 22 8.091	+ 3.4974	+ 18 56 0.55	8.261
η Draconis . S. P.	2.7	4 22 29.449	+ 0.8063	+118 14 4.10	8.222
* δ Mensæ	6.0	4 25 30 152	− 4.2251	− 80 28 25.28	+ 8.041
* *m* Persei	6.0	4 25 36.338	+ 4.2100	+ 42 49 32.80	8.008
A Draconis . S. P.	5.0	4 28 12.310	− 0.1351	+110 59 30.87	7.798
α Tauri (*Aldebaran*)	1.0	4 29 33.076	+ 3.4374	+ 16 17 7.50	7.518
* τ Tauri	4.3	4 35 34.962	3.5953	+ 22 44 35.27	7.189
α Camelopardalis	4.7	4 43 0.891	+ 5.9247	+ 66 9 10.05	+ 6.609
* *i* Tauri	5.3	4 44 52.840	3.5053	+ 18 39 0.33	6.410
ι Aurigæ	3.0	4 49 45.915	3.9006	+ 32 59 22.21	6.028
* ζ Aurigæ	4.0	4 54 43.158	+ 4.1850	+ 40 54 46.42	5.628
ε Ursæ Minoris . S. P.	4.3	4 57 21.942	− 6.3329	+ 97 46 52.45	5.415
11 Orionis	5.0	4 58 13.554	+ 3.4244	+ 15 14 55.39	+ 5.301
* β Eridani	3.0	5 2 23.566	2.9485	− 5 13 49.99	4.930
α Aurigæ (*Capella*)	1.0	5 8 29.365	4.4246	+ 45 53 2.66	4.035
β Orionis (*Rigel*)	1.0	5 9 12.197	2.8813	− 8 19 49.92	4.402
* τ Orionis	4.0	5 12 12.944	+ 2.9125	− 6 57 54.58	+ 4.140

* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

MEAN PLACES FOR 1889.0. (January $0^d.0-0^d.562$, Washington.)

Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
β Tauri . . .	2.0	5 19 16.506	+ 3.7892	+ 28 30 46.12	+ 3.364
Groombridge 966 .	6.3	5 24 53.555	8.0003	+ 74 58 6.64	3.079
* χ Aurigæ . . .	5.0	5 25 30.286	3.9049	+ 32 6 33.67	3.027
δ Orionis (*var.*) . .	2.5	5 26 20.146	3.0634	− 0 22 55.25	2.930
* Groombridge 944 .	6.3	5 26 29.694	18.6490	+ 85 8 19.62	2.934
α Leporis . . .	3.0	5 27 50.073	+ 2.6447	− 17 54 8.42	+ 2.805
ε Orionis . . .	2.0	5 30 34.851	3.0423	− 1 16 24.56	2.568
α Columbæ . .	2.0	5 35 37.839	+ 2.1728	− 34 8 1.74	2.083
ω Draconis . . S. P.	5.0	5 37 36.156	− 0.3539	+111 11 27.07	1.633
* κ Orionis . . .	2.7	5 42 29.495	+ 2.8448	− 9 42 35.00	1.534
* ν Aurigæ . . .	4.0	5 43 47.776	+ 4.1540	+ 39 6 54.00	+ 1.453
ψ^1 Draconis . . S. P.	4.3	5 43 54.757	− 1.0792	+107 47 49.12	1.679
* δ Doradus . . .	4.3	5 44 34.650	+ 0.1047	− 65 46 37.53	1.328
α Orionis (*var.*) . .	1.2	5 49 9.738	3.2470	+ 7 23 8.18	0.955
* β Aurigæ . . .	2.0	5 51 23.209	4.4017	+ 44 56 6.22	0.743
* θ Aurigæ . . .	3.0	5 52 9.163	+ 4.0920	+ 37 12 14.05	+ 0.598
ν Orionis . . .	4.7	6 1 14.116	3.4274	+ 14 46 51.29	− 0.138
22 Camelopardalis (H.)	4.7	6 6 36.586	+ 6.6174	+ 69 21 26.28	0.679
δ Ursæ Minoris . S. P.	4.3	6 8 7.106	−19.4640	+ 93 23 18.99	0.762
* η Geminorum . .	3.3	6 8 10.676	+ 3.6227	+ 22 32 17.46	0.732
μ Geminorum . .	3.0	6 16 14.743	+ 3.6315	+ 22 34 10.85	− 1.542
* ψ^1 Aurigæ . . .	5.3	6 16 20.990	4.6267	+ 49 20 36.53	1.440
α Argûs (*Canopus*) .	1.0	6 21 29.356	1.3304	− 52 38 6.81	1.869
* ν Geminorum . .	4.7	6 22 22.327	+ 3.5631	+ 20 16 53.60	1.976
* χ Draconis . . S. P.	4.0	6 23 3.415	− 1.0795	+107 18 56.17	1.638
γ Geminorum . .	2.3	6 31 17.974	+ 3.4674	+ 16 29 35.69	− 2.778
* ε Geminorum . .	3.3	6 37 6.152	3.6934	+ 25 14 24.80	3.246
* ψ^5 Aurigæ . . .	5.7	6 38 44.248	4.3290	+ 43 41 12.95	3.226
† α Canis Majoris (*Sirius*)	1.0	6 40 15.415	2.6436	− 16 33 52.01	4.711
* θ Geminorum . .	3.3	6 45 28.411	3.9606	+ 34 5 39.53	3.984
51 Cephei (H.) . .	5.3	6 48 15.529	+29.9160	+ 87 13 8.58	− 4.283
* ζ Mensæ . .	5.8	6 49 16.462	− 4.9014	− 80 41 45.21	4.197
50 Draconis . S. P.	6.0	6 49 56.965	− 1.9077	+104 41 50.31	4.411
ε Canis Majoris . .	1.7	6 54 15.831	+ 2.3577	− 28 49 17.84	4.716
* ζ Geminorum (*var.*) .	4.0	6 57 31.560	3.5627	+ 20 43 56.20	4.999
δ Canis Majoris . .	2.0	7 3 52.677	+ 2.4385	− 26 13 2.58	− 5.507
* 63 Aurigæ . . .	5.0	7 4 1.227	4.1367	+ 39 30 3.13	5.510
* 25 Camelopardalis .	4.7	7 7 41.692	+12.9613	+ 82 37 22.25	5.869
* γ^2 Volantis (*var.*) .	4.7	7 9 41.081	− 0.4935	− 70 19 7.87	6.005
δ Draconis . . S. P.	3.0	7 12 31.710	+ 0.0296	+112 32 1.39	6.326
δ Geminorum . .	3.3	7 13 29.632	+ 3.5879	+ 22 11 9.36	− 6.337
τ Draconis . . S. P.	4.7	7 17 41.138	− 1.1167	+106 51 2.92	6.776
Piazzi vii. 67 . .	6.0	7 19 19.690	+ 6.2990	+ 68 41 28.18	6.840
* β Canis Minoris . .	3.0	7 21 7.895	3.2597	+ 8 30 44.06	6.989
α^2 Geminorum (*Castor*)	1.7	7 27 31.094	3.8385	+ 32 7 52.70	7.550
† α Canis Min. (*Procyon*)	1.0	7 33 29.478	+ 3.1434	+ 5 30 31.75	− 8.992
λ Ursæ Minoris . S. P.	6.3	7 34 39.553	−64.7655	+ 91 2 7.46	8.059
β Geminorum (*Pollux*)	1.3	7 38 31.418	+ 3.6793	+ 28 17 36.87	8.414
* 26 Lyncis . . .	6.0	7 46 37.710	4.3883	+ 47 51 4.98	9.018
φ Geminorum . .	5.0	7 46 42.244	+ 3.6800	+ 27 3 8.82	− 9.027

***Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.**

†Periodic corrections given in the Appendix are still to be applied to the positions of Sirius and Procyon.

MEAN PLACES FOR 1889.0. (January $0^{d}.0$—$0^{d}.562$, Washington.)

Name of Star.		Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
			h m s	s	° ′ ″	″
* Groombridge 1374 .		5.7	7 46 53.710	+ 7.2867	+ 74 12 46.80	— 9.052
ε Draconis . .	S. P.	3.7	7 48 32.634	— 0.1790	+110 0 53.16	9.174
* ω¹ Cancri . . .		6.0	7 54 12.912	+ 3.6373	+ 25 41 46.11	9.576
3 Ursæ Majoris (H.) .		5.7	8 1 45.783	6.0495	+ 68 47 58.73	10.157
15 Argûs (ρ) . .		3.0	8 2 49.015	2.5545	— 23 59 5.12	10.193
* ζ¹ Cancri . . .		4.7	8 5 50.751	+ 3.4465	+ 17 58 52.73	—10.601
* β Cancri . . .		3.7	8 10 29.722	+ 3.2589	+ 9 31 36.92	10.855
κ Cephei (*pr.*) .	S. P.	4.3	8 12 36.881	— 1.9225	+102 37 23.40	10.995
* 30 Monocerotis . .		3.7	8 20 6.822	+ 3.0001	— 3 32 41.23	11.505
* θ Chamæleontis . .		4.7	8 23 57.328	— 1.7097	— 77 7 33.73	11.761
η Cancri . . .		5.7	8 26 17.416	+ 3.4784	+ 20 49 3.47	—12.002
Groombr. 3241 .	S. P.	6.3	8 30 28.881	— 0.2196	+107 50 39.88	12.221
* σ Hydræ . . .		5.0	8 32 57.441	+ 3.1459	+ 3 43 50.03	12.432
* γ Cancri . . .		4.3	8 36 51.750	3.4805	+ 21 52 1.40	12.723
ε Hydræ . . .		3.3	8 40 53.887	3.1818	+ 6 49 31.88	13.003
* σ² Cancri (*mean*) . .		5.7	8 47 28.307	+ 3.6736	+ 30 59 57.10	—13.405
ι Ursæ Majoris . .		3.0	8 51 36.333	+ 4.1335	+ 48 28 36.65	13.903
12 Year Cat. 1879	S. P.	6.0	8 52 36.200	— 2.5477	+ 99 51 51.84	13.684
σ² Ursæ Majoris . .		5.0	9 0 37.158	+ 5.3554	+ 67 35 4.04	14.273
κ Cancri . . .		5.0	9 1 44.134	3.2559	+ 11 6 52.17	14.290
* θ Hydræ . . .		4.0	9 8 35.383	+ 3.1262	+ 2 46 55.41	—15.016
* β Argûs . . .		1.5	9 11 58.734	0.6778	— 69 15 36.03	14.805
ι Argûs . . .		2.0	9 14 6.973	1.6012	— 58 48 33.59	14.997
* α Lyncis . . .		3.3	9 14 17.479	3.6693	+ 34 51 40.48	15.025
α Cephei . .	S. P.	2.7	9 15 55.820	1.4366	+117 53 4.72	15.172
1 Draconis (H.) . .		4.3	9 21 12.768	+ 9.0027	+ 81 48 57.38	—15.448
α Hydræ . . .		2.0	9 22 7.976	2.9491	— 8 10 40.35	15.450
d Ursæ Majoris . .		4.7	9 24 39.323	5.4016	+ 70 19 2.88	15.560
θ Ursæ Majoris . .		3.0	9 25 25.756	4.0414	+ 52 10 57 55	16.217
β Cephei (*pr.*) .	S. P.	3.0	9 27 13.511	0.7942	+109 55 35.68	15.756
* 10 Leonis Minoris .		4.7	9 27 25.377	+ 3.6943	+ 36 53 23.82	—15.781
* ο Leonis . . .		3.7	9 35 13.576	+ 3.2070	+ 10 23 48.81	16.218
* ζ Chamæleontis . .		5.0	9 37 7.937	— 1.5611	— 80 26 32.69	16.287
ε Leonis . . .		3.0	9 39 33.017	+ 3.4152	+ 24 17 5.73	16.425
11 Cephei . .	S. P.	5.0	9 40 17.731	0.9014	+109 11 58.49	16.538
μ Leonis . . .		4.0	9 46 27.018	+ 3.4222	+ 26 31 45.73	—16.796
* 19 Leonis Minoris .		5.3	9 50 53.108	3.6955	+ 41 35 1.81	16.961
79 Draconis . .	S. P.	6.3	9 51 28.907	0.7294	+106 49 21.96	17.013
* π Leonis . . .		5.0	9 54 20.854	3.1744	+ 8 34 35.09	17.139
α Leonis (*Regulus*) .		1.3	10 2 27.628	3.2007	+ 12 30 33.84	17.474
32 Ursæ Majoris . .		6.0	10 9 58.026	+ 4.4213	+ 65 39 41.53	—17.812
* λ Ursæ Majoris . .		3.3	10 10 24.042	3.6398	+ 43 28 5.03	17.873
γ¹ Leonis . . .		2.0	10 13 51.155	3.3149	+ 20 24 9.85	18.086
* μ Hydræ . . .		4.0	10 20 43.370	2.9006	— 16 16 12.69	18.310
* β Leonis Minoris .		4.3	10 21 27.833	3.4868	+ 37 16 32.70	18.314
* α Antliæ . . .		4.0	10 22 4.338	+ 2.7391	— 30 30 11.59	—18.217
9 Draconis (H.) . .		4.7	10 25 39.003	5.2641	+ 76 17 3.51	18.393
ρ Leonis . . .		4.0	10 26 58.020	3.1642	+ 9 52 38.99	18.432
226 Cephei (B.) .	S. P.	5.3	10 30 19.459	1.0776	+104 20 44.17	18.529
* β Octantis . .	S. P.	4.7	10 34 40.000	+ 6.4875	— 98 2 13.99	—18.681

*** Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.**

MEAN PLACES FOR 1889.0. (January 0^d.0–0^d.562, Washington.)

Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
* 41 Leonis Minoris	5.7	10 37 22.812	+ 3.2709	+ 23 46 9.43	−18.738
η Argûs (*var.*)	1–6	10 40 45.276	2.3134	− 59 6 3.83	18.870
l Leonis	5.3	10 43 25.386	3.1586	+ 11 7 56.40	18.972
* δ^2 Chamæleontis	5.0	10 44 44.251	0.6381	− 79 57 18.03	18.982
ι Cephei S. P.	3.3	10 45 43.679	2.1217	+114 23 0.23	18.877
* 46 Leonis Minoris	4.0	10 47 6.190	+ 3.3697	+ 34 48 47.78	−19.295
* Groombridge 1706	6.0	10 51 3.374	4.9712	+ 78 21 52.64	19.181
α Ursæ Majoris	2.0	10 56 52.393	+ 3.7478	+ 62 21 0.35	19.363
* η Octantis	6.0	11 0 5.148	− 0.2129	− 83 59 48.43	19.372
* p^3 Leonis	6.0	11 1 14.507	+ 3.0621	+ 2 33 27.94	19.487
* ψ Ursæ Majoris	3.3	11 3 25.277	+ 3.3936	+ 45 6 1.12	−19.504
δ Leonis	2.3	11 8 12.303	3.1983	+ 21 7 54.10	19.686
* ν Ursæ Majoris	3.3	11 12 29.096	3.2578	+ 33 41 59.66	19.569
δ Crateris	3.3	11 13 47.498	2.9964	− 14 10 41.14	19.464
o Cephei S. P.	5.3	11 14 4.222	2.4438	+112 29 44.44	19.669
τ Leonis	5.0	11 22 13.728	+ 3.0861	+ 3 28 2.77	−19.802
λ Draconis	3.3	11 24 48.376	3.6219	+ 69 56 36.98	19.838
* ξ Hydræ	4.0	11 27 32.540	2.9428	− 31 14 37.06	19.885
υ Leonis	5.0	11 31 15.931	3.0713	− 0 12 39.73	19.861
γ Cephei S. P.	3.3	11 34 47.549	2.4151	+102 59 14.10	20.075
* χ Ursæ Majoris	3.7	11 40 11.286	+ 3.1906	+ 48 23 41.22	−19.961
β Leonis	2.0	11 43 23.867	3.0640	+ 15 11 32.97	20.119
γ Ursæ Majoris	2.3	11 47 59.482	3.1820	+ 54 18 42.48	20.027
Groombr. 4163 S. P.	7.0	11 49 26.345	2.8647	+106 12 26.66	20.023
* π Virginis	4.3	11 55 11.076	3.0751	+ 7 13 59.71	20.088
o Virginis	4.0	11 59 33.282	+ 3.0576	+ 9 20 58.15	−20.015
* ε Corvi	3.0	12 4 24.951	3.0829	− 22 0 8.51	20.050
4 Draconis (H.)	4.7	12 6 59.905	2.8865	+ 78 13 59.00	20.022
γ Corvi	2.0	12 10 5.887	3.0795	− 16 55 32.18	20.018
* 2 Canum Venaticorum	5.3	12 10 33.803	3.0222	+ 41 16 41.52	20.067
β Chamæleontis	5.0	12 11 50.874	+ 3.3994	− 78 41 44.09	−20.003
η Virginis	3.3	12 14 13.631	3.0686	− 0 2 59.87	20.042
* 6 Ursæ Minoris	6.0	12 14 20.274	0.1510	+ 88 18 55.37	19.941
α^1 Crucis	1.0	12 20 25.728	3.2949	− 62 29 1.67	20.014
* δ^2 Corvi	2.3	12 24 7.388	3.1025	− 15 53 49.92	20.085
* β Canum Venaticorum	4.3	12 28 28.256	+ 2.8596	+ 41 57 38.31	−19.618
β Corvi	2.3	12 28 33.406	3.1416	− 22 46 58.30	19.963
κ Draconis	3.3	12 28 44.633	2.5921	+ 70 24 0.33	19.890
* γ Virginis (*mean*)	2.7	12 36 2.173	3.0383	− 0 50 26.57	19.815
21 Cassiopeæ S. P.	6.0	12 38 19.363	3.8568	+105 37 7.68	19.753
* 31 Comæ Berenices	5.0	12 46 17.594	+ 2.9302	+ 28 8 40.94	−19.662
32^2 Camelopardalis (H.)	4.7	12 48 19.066	0.3918	+ 84 0 58.36	19.596
* γ Cassiopeæ S. P.	2.0	12 50 0.701	3.5786	+119 53 4.60	19.564
α Canum Venaticorum	2.7	12 50 50.145	2.8156	+ 38 55 4.44	19.513
* 43 Cephei (H.) S. P.	4.3	12 53 40.961	7.2289	+ 94 20 19.49	19.505
* δ Muscæ	4.0	12 54 38.991	+ 4.1236	− 70 56 58.65	−19.476
* ε Virginis	2.7	12 56 39.115	2.9880	+ 11 33 21.03	19.418
θ Virginis	4.3	13 4 12.148	3.1011	− 4 56 46.60	19.313
* 20 Canum Venaticorum	4.7	13 12 33.902	2.6968	+ 41 9 25.53	19.036
α Urs. Min. (*Polaris*) S. P.	2.0	13 18 7.893	+23.1540	+ 91 17 0.50	−18.898

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MEAN PLACES FOR 1889.0. (January 0d.0—0d.562, Washington.)

Name of Star.		Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
			h m s	s	° ′ ″	″
Virginis (*Spica*) .		1.0	13 19 20.712	+ 3.1536	− 10 34 54.46	−18.901
Cassiopeæ .	S. P.	6.3	13 22 58.550	4.3771	+110 18 25.40	18.678
Octantis .	.	5.0	13 23 6.885	8.7381	− 85 12 58.86	18.750
Virginis .	.	3.3	13 29 2.222	3.0531	− 0 1 41.40	18.519
B. A. C. 4536 .	.	5.0	13 29 50.386	2.6824	+ 37 45 4.34	18.540
Virginis .	.	6.0	13 35 47.174	+ 3.1432	− 8 8 33.42	−18.291
η Ursæ Majoris .	.	2.0	13 43 10.040	2.3713	+ 49 52 2.53	18.080
η Bootis .	.	3.0	13 49 23.981	2.8568	+ 18 57 15.81	18.172
50 Cassiopeæ .	S. P.	4.0	13 53 57.831	5.0104	+108 6 58.74	17.648
θ Apodis .	.	5.0	13 54 32.161	5.6734	− 76 15 35.90	17.594
β Centauri .	.	1.0	13 55 59.474	+ 4.1773	− 59 50 13.72	−17.592
π Hydræ .	.	3.7	14 0 3.008	3.4007	− 26 8 48.01	17.365
α Draconis .	.	3.3	14 1 23.106	1.6237	+ 64 54 23.01	17.300
Bootis .	.	5.0	14 5 20.235	2.7387	+ 25 37 3.70	17.202
κ Virginis .	.	4.3	14 6 58.494	3.1937	− 9 45 24.50	16.930
δ Octantis .	.	5.0	14 9 12.367	+ 8.9729	− 83 9 29.08	−16.958
4 Ursæ Minoris .	.	5.0	14 9 17.346	− 0.3234	+ 78 4 8.96	16.907
α Bootis (*Arcturus*)	.	1.0	14 10 35.919	+ 2.7350	+ 19 45 37.98	18.885
λ Bootis .	.	4.0	14 12 9.826	2.2828	+ 46 35 53.49	16.661
λ Virginis .	.	4.7	14 13 6.230	3.2379	− 12 51 35.39	16.731
ι Cassiopeæ .	S. P.	4.0	14 19 55.288	+ 4.8616	+113 5 50.24	−16.435
θ Bootis .	.	4.0	14 21 25.140	2.0442	+ 52 21 50.27	16.763
ρ Bootis .	.	3.7	14 27 2.837	+ 2.5877	+ 30 51 31.94	15.962
5 Ursæ Minoris .	.	4.7	14 27 45.989	− 0.1908	+ 76 11 21.86	16.011
α² Centauri .	.	1.0	14 32 4.999	+ 4.0457	− 60 22 47.24	15.378
α Apodis .	.	4.7	14 34 6.484	+ 7.1920	− 78 34 21.58	−15.658
* μ Hydri .	S. P.	6.0	14 34 1.987	− 1.4365	−100 24 24.08	15.681
* 33 Bootis .	.	5.3	14 34 42.374	+ 2.2343	+ 44 53 1.14	15.712
ε Bootis .	.	2.3	14 40 8.421	2.6214	+ 27 32 32.78	15.344
α² Libræ .	.	2.3	14 44 44.253	+ 3.3094	− 15 34 48.37	15.171
β Ursæ Minoris .	.	2.0	14 51 2.057	− 0.2315	+ 74 36 32.77	−14.719
* 47 Cephei (H.) .	S. P.	6.0	14 51 21.107	+ 7.7197	+101 1 16.54	14.700
* γ Scorpii .	.	3.3	14 57 34.490	3.5020	− 24 50 42.33	14.359
β Bootis .	.	3.0	14 57 45.917	2.2601	+ 40 49 42.96	14.363
48 Cephei (H.) .	S. P.	6.3	15 6 15.292	7.4054	+102 40 27.75	13.735
* δ Bootis .	.	3.0	15 11 1.705	+ 2.4208	+ 33 43 45.81	−13.586
β Libræ .	.	2.0	15 11 2.032	3.2217	− 8 58 22.50	13.511
* ρ Octantis .	.	6.0	15 17 47.895	12.9719	− 84 5 34.10	12.992
μ¹ Bootis .	.	4.0	15 20 17.851	+ 2.2662	+ 37 46 0.53	12.781
γ² Ursæ Minoris .	.	3.0	15 20 54.544	− 0.1340	+ 72 13 44.27	12.811
* β Coronæ Borealis	.	4.0	15 23 15.181	+ 2.4751	+ 29 29 18.73	−12.597
α Coronæ Borealis	.	2.0	15 29 59.316	2.5393	+ 27 5 18.95	12.308
* γ Camelop. (H.) .	S. P.	4.3	15 38 38.882	6.2377	+109 0 39.56	11.549
α Serpentis .	.	2.3	15 38 48.034	2.9515	+ 6 46 30.77	11.554
ε Serpentis .	.	3.3	15 45 16.982	+ 2.9871	+ 4 48 44.54	11.052
ζ Ursæ Minoris .	.	4.3	15 48 2.193	− 2.2523	+ 78 8 8.15	−10.920
ε Coronæ Borealis	.	4.0	15 52 59.592	+ 2.4832	+ 27 11 58.85	10.614
δ Scorpii .	.	2.3	15 53 46.225	3.5386	− 22 18 18.51	10.531
β¹ Scorpii .	.	2.0	15 58 58.991	3.4807	− 19 30 3.78	10.142
* δ¹ Apodis .	.	5.3	16 3 46.960	+ 8.7729	− 78 24 50.91	− 9.739

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MEAN PLACES FOR 1889.0. (January 0d.0—0d.562, Washington.)

Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
* φ Herculis	4.0	16	5	16.152	+ 1.8813	+ 45	13	34.33	— 9.583
Groombridge 2320	6.3	16	6	1.043	0.1396	+ 68	6	9.64	9.498
δ Ophiuchi	3.0	16	8	31.723	3.1396	— 3	24	28.62	9.517
* σ Coronæ Borealis (*mean*)	5.7	16	10	31.247	2.2447	+ 34	8	25.41	9.259
τ Herculis	3.3	16	16	24.287	1.8010	+ 46	34	40.25	8.737
* γ Apodis	4.3	16	16	27.151	+ 9.0625	— 78	38	46.41	— 8.755
* η Ursæ Minoris	5.0	16	20	45.290	— 1.8169	+ 76	0	39.13	8.161
η Draconis	2.7	16	22	29.449	+ 0.8063	+ 61	45	55.90	8.222
α Scorpii (*Antares*)	1.3	16	22	36.096	3.6701	— 26	11	5.92	8.305
β Herculis	2.3	16	25	26.898	+ 2.5775	+ 21	43	55.05	8.059
A Draconis	5.0	16	28	12.310	— 0.1351	+ 69	0	29.13	— 7.798
ζ Ophiuchi	2.7	16	31	2.804	+ 3.2991	— 10	20	29.95	7.568
α Trianguli Australis	2.0	16	36	55.072	6.3033	— 68	49	20.51	7.161
η Herculis	3.3	16	39	5.410	2.0538	+ 39	8	1.29	7.024
α Camelopardalis S. P.	4.7	16	43	0.891	5.9247	+113	50	49.95	6.609
κ Ophiuchi	3.3	16	52	24.867	+ 2.8374	+ 9	32	53.39	— 5.834
ε Ursæ Minoris	4.3	16	57	21.942	— 6.3329	+ 82	13	7.55	5.415
d Herculis	5.0	16	57	30.473	+ 2.2113	+ 33	43	45.87	5.399
* η Ophiuchi	2.7	17	4	0.708	3.4363	— 15	35	12.39	4.741
a^1 Herculis (*var.*)	3.5	17	9	35.171	2.7335	+ 14	31	2.49	4.348
* π Herculis	3.0	17	11	10.884	+ 2.0891	+ 36	56	4.52	— 4.231
* θ Ophiuchi	3.3	17	15	11.541	3.6791	— 24	53	17.04	3.946
b Ophiuchi (*var.*)	5.0	17	19	35.482	3.6590	— 24	4	20.64	3.649
* δ Aræ	4.0	17	21	4.893	5.4014	— 60	35	24.86	3.530
Groombr. 966 S. P.	6.3	17	24	53.555	8.0003	+105	1	53.36	3.079
* Groombr. 944 S. P.	6.3	17	26	29.694	+18.6490	+ 94	51	40.38	— 2.934
β Draconis	2.7	17	27	55.517	1.3534	+ 52	23	1.21	2.798
α Ophiuchi	2.0	17	29	46.916	2.7829	+ 12	38	28.82	2.873
* ι Herculis	3.3	17	36	20.003	+ 1.6966	+ 46	3	56 26	2.068
ω Draconis	5.0	17	37	36.156	— 0.3539	+ 68	48	32.93	1.633
μ Herculis	3.3	17	42	6.892	+ 2.3464	+ 27	47	9.32	— 2.324
ψ^1 Draconis	4.3	17	43	54.757	— 1.0792	+ 72	12	10.88	1.679
* θ Herculis	4.0	17	52	26.754	+ 2.0551	+ 37	15	56.10	0.642
γ Draconis	2.3	17	54	1.722	1.3915	+ 51	30	7.51	0.552
γ^3 Sagittarii	3.3	17	58	40.635	3.8515	— 30	25	28.76	— 0.334
* ο Herculis	4.0	18	3	12.767	+ 2.3394	+ 28	44	51.31	+ 0.284
22 Camelop. (H.) S. P.	4.7	18	6	36.586	6.6174	+110	38	33.72	0.697
μ^1 Sagittarii	4.0	18	7	7.511	+ 3.5866	— 21	5	13.56	0.611
δ Ursæ Minoris	4.3	18	8	7.106	—19.4640	+ 86	36	41.01	0.762
η Serpentis	3.0	18	15	33.973	+ 3.1023	— 2	55	36.34	0.686
* λ Sagittarii	3.0	18	21	7.216	+ 3.7027	— 25	28	56.40	+ 1.635
* χ Draconis	4.0	18	23	3.415	— 1.0795	+ 72	41	3.83	1.638
1 Aquilæ	4.3	18	29	10.007	+ 3.2645	— 8	19	16.06	2.215
* ζ Pavonis	4.0	18	30	3.649	7.0294	— 71	31	15.88	2.482
α Lyræ (*Vega*)	1.0	18	33	10.834	2.0313	+ 38	40	50.19	3.166
σ Octantis	6.0	18	40	37.010	+106.2370	— 89	16	4.74	+ 3.516
β Lyræ (*var.*)	4.0	18	45	58.923	2.2142	+ 33	14	2.61	3.979
51 Cephei (H.) S. P.	5.3	18	48	15.529	29.9160	+ 92	46	51.42	4.283
σ Sagittarii	2.3	18	48	22.948	+ 3.7217	— 26	26	1.80	4.125
50 Draconis	6.0	18	49	56.965	— 1.9077	+ 75	18	9.69	+ 4.411

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MEAN PLACES FOR 1889.0. (January 0d.0–0d.562, Washington.)

Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
* γ Lyræ	3.3	18	54	47.500	+ 2.2442	+ 32	32	15.70	+ 4.760
ζ Aquilæ	3.0	19	0	18.508	2.7569	+ 13	41	56.21	5.113
* ι Lyræ	5.0	19	3	20.484	2.1411	+ 35	55	35.49	5.481
* 25 Camelopardalis S. P.	4.7	19	7	41.692	12.9613	+ 97	22	37.67	5.869
d Sagittarii	5.0	19	11	8.414	3.5123	− 19	8	59.07	6.107
δ Draconis	3.0	19	12	31.710	+ 0.0296	+ 67	27	58.61	+ 6.326
* θ Lyræ	4.3	19	12	30.870	+ 2.0790	+ 37	56	10.47	6.241
τ Draconis	4.7	19	17	41.138	− 1.1167	+ 73	8	57.08	6.776
Piazzi vii. 67 S. P.	6.0	19	19	19.690	+ 6.2990	+111	18	31.82	6.840
δ Aquilæ	3.3	19	19	54.103	3.0253	+ 2	53	38.37	6.927
* β Cygni	3.0	19	26	14.704	+ 2.4194	+ 27	43	36.83	+ 7.361
κ Aquilæ	5.0	19	30	55.175	+ 3.2289	− 7	16	25.01	7.749
λ Ursæ Minoris	6.3	19	34	39.553	−64.7655	+ 88	57	52.54	8.059
* β Sagittæ	4.3	19	36	3.820	+ 2.6955	+ 17	13	8.97	8.133
γ Aquilæ	3.0	19	40	58.957	2.8522	+ 10	20	35.55	8.543
* δ Cygni	2.7	19	41	30.373	+ 1.8761	+ 44	51	36.10	+ 8.630
α Aquilæ (*Altair*)	1.3	19	45	22.060	2.9276	+ 8	34	32.13	9.269
* Groombr. 1374 S. P.	5.7	19	46	53.710	7.2867	+105	47	13.20	9.052
* ε Pavonis	4.0	19	47	44.260	+ 7.0202	− 73	12	5.27	9.083
ε Draconis	3.7	19	48	32.634	− 0.1790	+ 69	59	6.84	9.174
β Aquilæ	4.0	19	49	51.654	+ 2.9471	+ 6	7	47.70	+ 8.758
* γ Sagittæ	3.7	19	53	49.255	2.6678	+ 19	11	28.09	9.593
* c Sagittarii	5.0	19	55	49.868	3.6949	− 28	1	3.93	9.728
τ Aquilæ	6.0	19	58	43.097	2.9331	+ 6	57	54.33	9.936
3 Ursæ Majoris (H.) S. P.	5.7	20	1	45.783	6.0495	+111	12	1.27	10.157
* θ Aquilæ	3.0	20	5	34.624	+ 3.0972	− 1	9	1.14	+10.455
* 31 Cygni	4.3	20	10	8.196	1.8893	+ 46	24	17.51	10.787
α^2 Capricorni	3.0	20	11	53.750	+ 3.3322	− 12	53	18.03	10.914
κ Cephei (*pr.*)	4.3	20	12	36.881	− 1.9225	+ 77	22	36.60	10.995
α Pavonis	2.0	20	16	52.196	+ 4.7843	− 57	5	23.09	11.186
γ Cygni	2.3	20	18	14.783	+ 2.1537	+ 39	54	5.73	+11.369
π Capricorni	5.0	20	20	58.072	3.4397	− 18	34	30.30	11.554
ε Delphini	4.0	20	27	54.624	+ 2.8672	+ 10	55	35.40	12.037
Groombridge 3241	6.3	20	30	28.881	− 0.2196	+ 72	9	20.12	12.221
* α Delphini	3.0	20	34	28.938	+ 2.7878	+ 15	31	14.83	12.519
* β Pavonis	3.7	20	34	56 978	+ 5.4746	− 66	36	3.20	+12.526
α Cygni	1.7	20	37	38.894	2.0444	+ 44	53	1.87	12.723
* ψ Capricorni	4.3	20	39	31.279	3.5586	− 25	40	9.43	12.687
* ε Cygni	2.7	20	41	43.211	2.4276	+ 33	33	16.72	13.338
μ Aquarii	4.7	20	46	40.015	+ 3.2398	− 9	23	57.95	13.288
12 Year Catalogue, 1879.	6.0	20	52	36.200	− 2.5477	+ 80	8	8.16	+13.684
ν Cygni	4.0	20	53	2.100	+ 2.2341	+ 40	44	24.11	13.724
σ^2 Ursæ Majoris S. P.	5.0	21	0	37.158	5.3554	+112	24	55.96	14.273
61^1 Cygni	5.0	21	1	55.279	2.6832	+ 38	12	13.60	17.530
ζ Cygni	3.0	21	8	12.696	2.5496	+ 29	46	18.54	14.609
* τ Cygni	4.0	21	10	21.636	+ 2.3934	+ 37	34	18.49	+15.262
α Cephei	2.7	21	15	55.820	1.4366	+ 62	6	55.28	15.172
1 Pegasi	4.3	21	16	57.160	2.7722	+ 19	19	47.46	15.240
* ζ Capricorni	4.3	21	20	19.702	3.4327	− 22	53	29.98	15.399
1 Draconis (H.) S. P.	4.0	21	21	12.768	+ 9.0027	+ 98	11	2.62	+15.448

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MEAN PLACES FOR 1889.0. (January 0d.0–0d.562, Washington.)

Name of Star.		Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
			h m s	s	° ′ ″	″
d Ursæ Majoris	S. P.	4.7	21 24 39.323	+ 5.4016	+109 40 57.12	+15.560
β Aquarii		3.0	21 25 42.938	3.1618	− 6 3 33.09	15.661
β Cephei (*pr.*)		3.0	21 27 13.511	0.7942	+ 70 4 24.32	15.756
ξ Aquarii		5.0	21 31 50.594	3.1980	− 8 21 6.06	15.971
* 74 Cygni		5.0	21 32 30.009	2.4014	+ 39 54 53.60	16.051
* λ^1 Octantis		5.3	21 33 48.482	+ 9.7927	− 83 13 42.17	+16.031
* ζ Chamæleontis	S. P.	5.0	21 37 7.937	− 1.5611	− 99 33 27.31	16.287
ε Pegasi		2.3	21 38 44.078	+ 2.9467	+ 9 21 58.91	16.356
11 Cephei		5.0	21 40 17.731	0.9014	+ 70 48 1.51	16.538
* π^2 Cygni		4.3	21 42 41.567	2.2132	+ 48 47 46.20	16.542
μ Capricorni		5.0	21 47 14.652	+ 3.2761	− 14 4 26.36	+16.779
* 16 Pegasi		5.3	21 48 0.692	2.7278	+ 25 24 11.11	16.819
79 Draconis		6.3	21 51 28.907	0.7294	+ 73 10 38.04	17.013
α Aquarii		3.0	22 0 4.964	3.0827	− 0 51 31.91	17.356
α Gruis		2.0	22 1 14.085	3.8063	− 47 29 52.96	17.247
* π Pegasi		4.0	22 5 3.475	+ 2.6600	+ 32 38 1.78	+17.580
32 Ursæ Majoris	S. P.	6.0	22 9 58.026	4.4213	+114 20 18.47	17.812
* υ Octantis		6.0	22 10 11.758	13.1930	− 86 31 50.03	17.882
θ Aquarii		4.3	22 10 58.582	3.1692	− 8 20 8.77	17.802
* γ Aquarii		3.3	22 15 55.360	3.1008	− 1 56 47.39	18.031
π Aquarii		4.7	22 19 36.513	+ 3.0647	+ 0 48 51.63	+18.155
* σ Aquarii		5.0	22 24 46.277	3.1758	− 11 14 44.61	18.311
9 Draconis	S. P.	4.7	22 25 39.003	5.2641	+103 42 56.49	18.393
* α Lacertæ		4.0	22 26 43.112	2.4621	+ 49 42 42.77	18.409
η Aquarii		4.0	22 29 39.148	3.0837	− 0 41 21.96	18.458
226 Cephei (B.)		5.3	22 30 19.459	+ 1.0776	+ 75 39 15.83	+18.529
* 10 Lacertæ		5.0	22 34 16.849	2.6865	+ 38 28 21.58	18.663
* β Octantis		4.7	22 34 40.000	6.4875	− 81 57 46.01	18.681
ζ Pegasi		3.3	22 35 55.576	2.9909	+ 10 15 7.51	18.706
* λ Pegasi		4.0	22 41 11.073	2.8851	+ 22 58 53.94	18.874
ι Cephei		3.3	22 45 43.679	+ 2.1217	+ 65 36 59.77	+18.877
λ Aquarii		4.0	22 46 49.438	3.1328	− 8 10 12.18	19.075
* Groombr. 1706	S. P.	6.0	22 51 3.374	4.9712	+101 38 7.36	19.181
α Pis. Aus. (*Fomalhaut*)		1.3	22 51 30.957	3.3249	− 30 12 37.31	18.993
* ο Andromedæ		3.7	22 56 48.847	2.7498	+ 41 43 45.72	19.287
α Ursæ Majoris	S. P.	2.0	22 56 52.393	+ 3.7478	+117 38 59.65	+19.363
α Pegasi (*Markab*)		2.0	22 59 13.910	2.9849	+ 14 36 29.13	19.302
* φ Aquarii		4.3	23 8 34.450	3.1088	− 6 38 49.97	19.358
ο Cephei		5.3	23 14 4.222	2.4438	+ 67 30 15.56	19.669
* τ Pegasi		4.7	23 15 8.580	2.9635	+ 23 7 57.74	19.655
θ Piscium		4.7	23 22 20.240	+ 3.0411	+ 5 46 9.13	+19.727
λ Draconis	S. P.	3.3	23 24 48.376	3.6219	+110 3 23.02	19.838
* λ Andromedæ		4.0	23 32 7.944	2.9220	+ 45 51 23.56	19.470
ι Piscium		4.3	23 34 14.471	3.0841	+ 5 1 28.91	19.484
γ Cephei		3.3	23 34 47.549	2.4151	+ 77 0 45.90	20.075
* i^1 Aquarii		5.0	23 38 26.683	+ 3.1170	− 18 53 34.41	+19.958
* δ Sculptoris		4.3	23 43 8.645	3.1326	− 28 44 37.78	19.855
* γ^1 Octantis		5.3	23 45 33.675	3.6913	− 82 38 8.58	19.992
Groombridge 4163		7.0	23 49 26.345	2.8647	+ 73 47 33.34	20.023
ω Piscium		4.0	23 53 36.693	3.0784	+ 6 14 55.50	19.931
* 33 Piscium		5.0	23 59 39.241	+ 3.0709	− 6 19 42.47	+20.144

* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Ursæ Minoris. (*Polaris.*)		Mean Solar Date.	51 Cephei (Hev.)		Mean Solar Date.	δ Ursæ Minoris.		Mean Solar Date.	λ Ursæ Minoris.	
	Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*
Jan.	$1^{h}\ 17^{m}$	$+88^{\circ}\ 43'$	Jan.	$6^{h}\ 48^{m}$	$+87^{\circ}\ 13'$	Jan.	$18^{h}\ 7^{m}$	$+86^{\circ}\ 36'$	Jan.	$19^{h}\ 33^{m}$	$+88^{\circ}\ 57'$
	s	″		s	″		s	″		s	″
0.3	82.11	12.4	0.5	33.16	5.2	1.0	50.49	41.6	1.1	51.75	58.3
1.3	81.20	12.6	1.5	33.34	5.6	2.0	50.45	41.3	2.1	51.14	58.0
2.3	80.23	12.7	2.5	33.50	5.9	3.0	50.44	40.9	3.1	50.57	57.6
3.3	79.19	12.9	3.5	33.62	6.3	4.0	50.45	40.5	4.1	50.06	57.3
4.3	78.12	13.0	4.5	33.70	6.7	5.0	50.48	40.1	5.0	49.63	56.9
5.3	77.03	13.0	5.5	33.75	7.0	6.0	50.53	39.7	6.0	49.30	56.6
6.3	75.94	13.1	6.5	33.77	7.4	7.0	50.61	39.4	7.0	49.04	56.2
7.3	74.88	13.1	7.5	33.76	7.7	8.0	50.69	39.0	8.0	48.85	55.9
8.3	73.88	13.2	8.5	33.75	8.0	9.0	50.78	38.7	9.0	48.68	55.5
9.2	72.94	13.2	9.5	33.73	8.3	10.0	50.87	38.4	10.0	48.52	55.2
10.2	72.03	13.2	10.5	33.72	8.7	10.9	50.95	38.1	11.0	48.35	54.9
11.2	71.15	13.2	11.5	33.73	9.0	11.9	51.02	37.8	12.0	48.14	54.6
12.2	70.27	13.3	12.5	33.75	9.2	12.9	51.08	37.5	13.0	47.90	54.3
13.2	69.38	13.3	13.5	33.78	9.5	13.9	51.14	37.1	14.0	47.63	54.0
14.2	68.44	13.4	14.5	33.81	9.9	14.9	51.21	36.8	15.0	47.36	53.7
15.2	67.46	13.4	15.4	33.83	10.2	15.9	51.29	36.5	16.0	47.10	53.3
16.2	66.42	13.5	16.4	33.83	10.5	16.9	51.39	36.1	17.0	46.91	53.0
17.2	65.34	13.5	17.4	33.81	10.9	17.9	51.51	35.7	18.0	46.75	52.6
18.2	64.21	13.5	18.4	33.76	11.3	18.9	51.65	35.4	19.0	46.69	52.2
19.2	63.09	13.5	19.4	33.67	11.6	19.9	51.81	35.0	20.0	46.71	51.9
20.2	62.01	13.5	20.4	33.56	12.0	20.9	51.98	34.7	21.0	46.80	51.5
21.2	60.97	13.4	21.4	33.43	12.3	21.9	52.16	34.4	22.0	46.94	51.2
22.2	59.98	13.3	22.4	33.30	12.6	22.9	52.34	34.1	23.0	47.09	50.8
23.2	59.05	13.3	23.4	33.17	12.9	23.9	52.51	33.8	24.0	47.24	50.5
24.2	58.18	13.2	24.4	33.05	13.2	24.9	52.67	33.5	25.0	47.36	50.2
25.2	57.32	13.2	25.4	32.95	13.5	25.9	52.82	33.3	26.0	47.44	49.9
26.2	56.47	13.1	26.4	32.87	13.7	26.9	52.97	33.0	27.0	47.48	49.6
27.2	55.62	13.1	27.4	32.80	14.0	27.9	53.11	32.7	28.0	47.50	49.3
28.2	54.69	13.1	28.4	32.73	14.3	28.9	53.26	32.4	29.0	47.53	49.0
29.2	53.73	13.0	29.4	32.65	14.7	29.9	53.44	32.1	30.0	47.60	48.7
30.2	52.73	13.0	30.4	32.54	15.0	30.9	53.63	31.8	31.0	47.72	48.3
31.2	51.67	12.9	31.4	32.38	15.3	31.9	53.84	31.4	32.0	47.92	47.9
32.2	50.62	12.8	32.4	32.20	15.7	32.9	54.08	31.1			

CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Ursæ Minoris. (*Polaris*.)		Mean Solar Date.	51 Cephei (Hev.)		Mean Solar Date.	δ Ursæ Minoris.		Mean Solar Date.	λ Ursæ Minoris.	
	Right Ascension.	Declination *North*.		Right Ascension.	Declination *North*.		Right Ascension.	Declination *North*.		Right Ascension.	Declination *North*.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′
Feb.	1 17	+88 43	Feb.	6 48	+87 13	Feb.	18 7	+86 36	Feb.	19 33	+88 57
	s	″		s	″		s	″		s	″
1.2	50.62	12.8	1.4	32.20	15.7	1.9	54.08	31.1	1.0	47.92	47.9
2.2	49.58	12.7	2.4	31.99	16.0	2.9	54.33	30.8	2.0	48.19	47.6
3.2	48.55	12.6	3.4	31.75	16.3	3.9	54.59	30.5	3.0	48.57	47.2
4.2	47.60	12.5	4.4	31.50	16.6	4.9	54.86	30.3	4.0	49.01	46.9
5.2	46.70	12.3	5.4	31.24	16.9	5.9	55.13	30.0	5.0	49.50	46.6
6.2	45.88	12.2	6.4	30.99	17.1	6.9	55.40	29.8	6.0	50.00	46.3
7.2	45.06	12.0	7.4	30.75	17.4	7.9	55.66	29.6	7.0	50.49	46.0
8.2	44.28	11.9	8.4	30.53	17.6	8.9	55.90	29.4	8.0	50.95	45.7
9.2	43.50	11.7	9.4	30.32	17.9	9.9	56.13	29.2	8.9	51.38	45.4
10.2	42.70	11.6	10.4	30.12	18.1	10.9	56.36	28.9	9.9	51.77	45.1
11.2	41.88	11.5	11.4	29.91	18.4	11.9	56.60	28.7	10.9	52.14	44.8
12.2	40.98	11.3	12.4	29.69	18.6	12.9	56.86	28.4	11.9	52.52	44.5
13.2	40.06	11.2	13.4	29.45	18.9	13.9	57.14	28.1	12.9	52.92	44.2
14.2	39.10	11.0	14.4	29.19	19.2	14.9	57.44	27.9	13.9	53.39	43.9
15.1	38.14	10.9	15.4	28.89	19.5	15.9	57.74	27.6	14.9	53.93	43.6
16.1	37.22	10.7	16.4	28.57	19.8	16.9	58.06	27.4	15.9	54.55	43.2
17.1	36.37	10.4	17.4	28.22	20.1	17.9	58.39	27.2	16.9	55.24	42.9
18.1	35.56	10.2	18.4	27.87	20.3	18.8	58.72	27.0	17.9	55.98	42.6
19.1	34.83	10.0	19.4	27.52	20.5	19.8	59.04	26.9	18.9	56.75	42.3
20.1	34.15	9.8	20.4	27.18	20.7	20.8	59.35	26.7	19.9	57.51	42.1
21.1	33.52	9.6	21.4	26.87	20.9	21.8	59.66	26.6	20.9	58.26	41.9
22.1	32.89	9.4	22.3	26.58	21.1	22.8	59.95	26.4	21.9	58.95	41.6
23.1	32.26	9.2	23.3	26.30	21.2	23.8	60.23	26.3	22.9	59.60	41.4
24.1	31.62	9.0	24.3	26.03	21.4	24.8	60.51	26.1	23.9	60.22	41.2
25.1	30.93	8.8	25.3	25.75	21.6	25.8	60.80	26.0	24.9	60.83	41.0
26.1	30.21	8.6	26.3	25.45	21.8	26.8	61.11	25.8	25.9	61.45	40.7
27.1	29.45	8.4	27.3	25.13	22.1	27.8	61.44	25.6	26.9	62.11	40.4
28.1	28.67	8.2	28.3	24.79	22.3	28.8	61.78	25.4	27.9	62.84	40.2
29.1	27.91	8.0	29.3	24.41	22.5	29.8	62.14	25.2	28.9	63.65	39.9
									29.9	64.54	39.6

CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Ursæ Minoris. (*Polaris.*)		Mean Solar Date.	51 Cephei (Hev.)		Mean Solar Date.	δ Ursæ Minoris.		Mean Solar Date.	λ Ursæ Minoris.	
	Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*
Mar.	h m 1 17	+88° 42′	Mar.	h m 6 48	+87° 13′	Mar.	h m 18 8	+86° 36′	Mar.	h m 19 34	+88° 57′
	s	″		s	″		s	″		s	″
1.1	27.91	68.0	1.3	24.41	22.5	1.8	2.14	25.2	1.9	4.54	39.6
2.1	27.18	67.7	2.3	24.00	22.7	2.8	2.52	25.1	2.9	5.50	39.4
3.1	26.50	67.4	3.3	23.58	22.9	3.8	2.90	25.0	3.9	6.50	39.1
4.1	25.91	67.1	4.3	23.14	23.1	4.8	3.28	24.9	4.9	7.53	38.9
5.1	25.37	66.8	5.3	22.72	23.2	5.8	3.65	24.8	5.9	8.54	38.7
6.1	24.90	66.6	6.3	22.32	23.3	6.8	4.01	24.7	6.9	9.53	38.6
7.1	24.44	66.3	7.3	21.93	23.4	7.8	4.35	24.7	7.9	10.47	38.4
8.1	24.01	66.0	8.3	21.56	23.5	8.8	4.67	24.6	8.9	11.36	38.2
9.1	23.59	65.8	9.3	21.21	23.7	9.8	5.00	24.5	9.9	12.23	38.1
10.1	23.12	65.5	10.3	20.86	23.8	10.8	5.33	24.5	10.9	13.09	37.9
11.1	22.63	65.3	11.3	20.50	23.9	11.8	5.67	24.4	11.9	13.96	37.7
12.1	22.09	65.0	12.3	20.13	24.1	12.8	6.01	24.3	12.9	14.86	37.5
13.1	21.55	64.8	13.3	19.74	24.2	13.8	6.37	24.2	13.9	15.81	37.3
14.1	21.00	64.5	14.3	19.32	24.4	14.8	6.75	24.1	14.9	16.83	37.0
15.1	20.45	64.2	15.3	18.88	24.5	15.8	7.14	24.0	15.9	17.92	36.9
16.1	19.96	63.9	16.3	18.43	24.6	16.8	7.53	23.9	16.9	19.07	36.7
17.1	19.54	63.6	17.3	17.97	24.7	17.8	7.93	23.9	17.9	20.24	36.5
18.1	19.19	63.2	18.3	17.50	24.8	18.8	8.32	23.9	18.8	21.40	36.4
19.1	18.90	62.9	19.3	17.04	24.9	19.8	8.69	23.9	19.8	22.53	36.3
20.1	18.67	62.6	20.3	16.61	24.9	20.8	9.05	24.0	20.8	23.63	36.2
21.1	18.48	62.3	21.3	16.21	24.9	21.8	9.39	24.0	21.8	24.66	36.1
22.1	18.31	62.0	22.3	15.83	24.9	22.8	9.72	24.0	22.8	25.66	36.0
23.0	18.12	61.7	23.3	15.47	25.0	23.8	10.03	24.0	23.8	26.62	35.9
24.0	17.90	61.5	24.3	15.12	25.0	24.8	10.35	24.0	24.8	27.57	35.8
25.0	17.64	61.2	25.3	14.74	25.1	25.8	10.68	24.0	25.8	28.54	35.7
26.0	17.34	61.0	26.3	14.35	25.1	26.7	11.03	24.0	26.8	29.56	35.6
27.0	17.02	60.7	27.3	13.94	25.2	27.7	11.39	24.0	27.8	30.63	35.5
28.0	16.72	60.4	28.3	13.50	25.3	28.7	11.77	24.0	28.8	31.76	35.4
29.0	16.44	60.1	29.3	13.04	25.3	29.7	12.16	24.0	29.8	32.97	35.3
30.0	16.21	59.7	30.3	12.57	25.3	30.7	12.55	24.0	30.8	34.23	35.2
31.0	16.04	59.4	31.2	12.09	25.4	31.7	12.94	24.1	31.8	35.50	35.1
32.0	15.96	50.0	32.2	11.61	25.3	32.7	13.32	24.2	32.8	36.77	35.1

CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Ursæ Minoris. (*Polaris.*)		Mean Solar Date.	51 Cephei (Hev.)		Mean Solar Date.	δ Ursæ Minoris.		Mean Solar Date.	λ Ursæ Minoris.	
	Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*
Apr.	h m 1 17	+88° 42′	Apr.	h m 6 47	+87° 13′	Apr.	h m 18 8	+86° 36′	Apr.	h m 19 34	+88° 57′
	s	″		s	″		s	″		s	″
1.0	15.96	59.0	1.2	71.61	25.3	1.7	13.32	24.2	1.8	36.77	35.1
2.0	15.94	58.7	2.2	71.14	25.3	2.7	13.69	24.3	2.8	38.01	35.1
3.0	15.96	58.3	3.2	70.71	25.2	3.7	14.04	24.4	3.8	39.19	35.0
4.0	16.02	58.0	4.2	70.31	25.2	4.7	14.37	24.5	4.8	40.31	35.0
5.0	16.07	57.7	5.2	69.92	25.2	5.7	14.69	24.6	5.8	41.37	35.0
6.0	16.13	57.4	6.2	69.54	25.1	6.7	14.99	24.7	6.8	42.41	35.0
7.0	16.14	57.2	7.2	69.16	25.1	7.7	15.31	24.8	7.8	43.43	35.0
8.0	16.10	56.9	8.2	68.78	25.1	8.7	15.63	24.9	8.8	44.46	34.9
9.0	16.05	56.6	9.2	68.38	25.0	9.7	15.96	24.9	9.8	45.54	34.9
10.0	15.99	56.3	10.2	67.97	25.0	10.7	16.30	25.0	10.8	46.68	34.9
11.0	15.94	56.0	11.2	67.53	25.0	11.7	16.65	25.1	11.8	47.88	34.8
12.0	15.91	55.7	12.2	67.07	25.0	12.7	17.00	25.2	12.8	49.11	34.8
13.0	15.97	55.3	13.2	66.61	24.9	13.7	17.36	25.3	13.8	50.37	34.8
14.0	16.08	55.0	14.2	66.16	24.8	14.7	17.71	25.5	14.8	51.62	34.8
15.0	16.26	54.7	15.2	65.72	24.7	15.7	18.03	25.7	15.8	52.85	34.9
16.0	16.51	54.3	16.2	65.30	24.6	16.7	18.35	25.8	16.8	54.02	35.0
17.0	16.81	54.0	17.2	64.91	24.5	17.7	18.65	26.0	17.8	55.13	35.0
18.0	17.13	53.7	18.2	64.55	24.4	18.7	18.92	26.2	18.8	56.17	35.1
19.0	17.45	53.5	19.2	64.22	24.2	19.7	19.18	26.4	19.8	57.17	35.2
20.0	17.75	53.2	20.2	63.90	24.1	20.7	19.44	26.6	20.8	58.13	35.3
21.0	18.00	53.0	21.2	63.59	24.0	21.7	19.69	26.7	21.8	59.10	35.3
22.0	18.22	52.7	22.2	63.26	23.9	22.7	19.96	26.8	22.8	60.09	35.4
23.0	18.41	52.4	23.2	62.91	23.8	23.7	20.25	27.0	23.7	61.12	35.4
24.0	18.59	52.2	24.2	62.54	23.7	24.7	20.55	27.1	24.7	62.20	35.5
25.0	18.79	51.9	25.2	62.15	23.6	25.7	20.85	27.3	25.7	63.33	35.5
25.9	19.03	51.6	26.2	61.75	23.5	26.7	21.16	27.5	26.7	64.51	35.6
26.9	19.32	51.3	27.2	61.34	23.3	27.7	21.47	27.7	27.7	65.72	35.7
27.9	19.68	50.9	28.2	60.93	23.2	28.7	21.77	27.9	28.7	66.91	35.8
28.9	20.12	50.6	29.2	60.53	23.0	29.7	22.05	28.2	29.7	68.08	35.9
29.9	20.61	50.3	30.2	60.16	22.8	30.6	22.31	28.4	30.7	69.18	36.1
30.9	21.13	50.1	31.2	59.83	22.6	31.6	22.55	28.7	31.7	70.21	36.2
31.9	21.67	49.8									

CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Ursæ Minoris. (*Polaris.*)		Mean Solar Date.	51 Cephei (Hev.)		Mean Solar Date.	δ Ursæ Minoris.		Mean Solar Date.	λ Ursæ Minoris.	
	Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*
May	$1^{h}\ 17^{m}$	$+88^{\circ}\ 42'$	May	$6^{h}\ 47^{m}$	$+87^{\circ}\ 13'$	May	$18^{h}\ 8^{m}$	$+86^{\circ}\ 36'$	May	$19^{h}\ 35^{m}$	$+88^{\circ}\ 57'$
	s	″		s	″		s	″		s	″
1.9	21.67	49.8	1.2	59.83	22.6	1.6	22.55	28.7	1.7	10.21	36.2
2.9	22.19	49.6	2.2	59.53	22.4	2.6	22.77	28.9	2.7	11.18	36.4
3.9	22.68	49.3	3.2	59.25	22.2	3.6	22.99	29.2	3.7	12.09	36.5
4.9	23.14	49.1	4.2	58.97	22.0	4.6	23.20	29.4	4.7	12.98	36.7
5.9	23.55	48.9	5.1	58.69	21.8	5.6	23.40	29.6	5.7	13.86	36.8
6.9	23.94	48.6	6.1	58.41	21.7	6.6	23.61	29.8	6.7	14.75	36.9
7.9	24.34	48.4	7.1	58.12	21.5	7.6	23.84	30.0	7.7	15.68	37.0
8.9	24.75	48.1	8.1	57.80	21.4	8.6	24.08	30.2	8.7	16.68	37.1
9.9	25.21	47.9	9.1	57.47	21.2	9.6	24.32	30.4	9.7	17.70	37.3
10.9	25.74	47.6	10.1	57.13	21.0	10.6	24.56	30.7	10.7	18.75	37.4
11.9	26.34	47.3	11.1	56.80	20.8	11.6	24.78	30.9	11.7	19.79	37.6
12.9	27.00	47.1	12.1	56.48	20.6	12.6	24.99	31.2	12.7	20.80	37.8
13.9	27.70	46.8	13.1	56.18	20.3	13.6	25.19	31.5	13.7	21.77	38.0
14.9	28.44	46.6	14.1	55.92	20.1	14.6	25.36	31.8	14.7	22.66	38.2
15.9	29.18	46.4	15.1	55.69	19.8	15.6	25.51	32.1	15.7	23.47	38.4
16.9	29.90	46.3	16.1	55.49	19.5	16.6	25.64	32.4	16.7	24.22	38.7
17.9	30.59	46.1	17.1	55.31	19.3	17.6	25.76	32.7	17.7	24.91	38.9
18.9	31.23	45.9	18.1	55.15	19.1	18.6	25.87	33.0	18.7	25.59	39.1
19.9	31.84	45.8	19.1	54.97	18.8	19.6	26.00	33.2	19.7	26.27	39.3
20.9	32.42	45.6	20.1	54.79	18.6	20.6	26.14	33.5	20.7	26.98	39.5
21.9	33.00	45.4	21.1	54.58	18.4	21.6	26.28	33.7	21.7	27.73	39.6
22.9	33.61	45.2	22.1	54.36	18.2	22.6	26.43	34.0	22.7	28.53	39.8
23.9	34.25	45.0	23.1	54.12	18.0	23.6	26.60	34.2	23.7	29.37	40.0
24.9	34.94	44.8	24.1	53.86	17.7	24.6	26.76	34.5	24.7	30.22	40.2
25.9	35.72	44.6	25.1	53.62	17.5	25.6	26.90	34.8	25.7	31.07	40.5
26.9	36.56	44.4	26.1	53.39	17.2	26.6	27.03	35.2	26.7	31.89	40.7
27.9	37.45	44.2	27.1	53.18	16.9	27.6	27.15	35.5	27.7	32.67	41.0
28.9	38.33	44.1	28.1	53.01	16.6	28.6	27.24	35.8	28.7	33.36	41.3
29.9	39.21	43.9	29.1	52.87	16.3	29.6	27.31	36.1	29.7	33.98	41.6
30.9	40.06	43.8	30.1	52.75	16.0	30.6	27.37	36.5	30.6	34.52	41.9
31.9	40.86	43.7	31.1	52.65	15.7	31.6	27.41	36.8	31.6	35.03	42.1
32.8	41.62	43.6	32.1	52.56	15.4	32.6	27.46	37.0	32.6	35.52	42.4

CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Ursæ Minoris. (*Polaris.*)		Mean Solar Date.	51 Cephei (Hev.)		Mean Solar Date.	δ Ursæ Minoris.		Mean Solar Date.	λ Ursæ Minoris.	
	Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*
June	h m 1 17	+88° 42′	June	h m 6 47	+87° 13′	June	h m 18 8	+86° 36′	June	h m 19 35	+88° 57′
	s	″		s	″		s	″		s	″
1.8	41.62	43.6	1.1	52.56	15.4	1.6	27.46	37.0	1.6	35.52	42.4
2.8	42.33	43.5	2.1	52.47	15.2	2.6	27.51	37.3	2.6	36.01	42.6
3.8	43.03	43.4	3.1	52.36	14.9	3.6	27.57	37.6	3.6	36.51	42.8
4.8	43.74	43.2	4.1	52.23	14.7	4.6	27.64	37.8	4.6	37.06	43.1
5.8	44.48	43.1	5.1	52.09	14.5	5.6	27.71	38.1	5.6	37.65	43.3
6.8	45.27	43.0	6.1	51.96	14.2	6.6	27.77	38.4	6.6	38.27	43.5
7.8	46.13	42.8	7.1	51.81	13.9	7.6	27.83	38.7	7.6	38.89	43.8
8.8	47.04	42.7	8.1	51.68	13.6	8.6	27.88	39.1	8.6	39.49	44.1
9.8	48.01	42.6	9.1	51.57	13.3	9.5	27.92	39.4	9.6	40.03	44.4
10.8	49.01	42.5	10.1	51.48	13.0	10.5	27.93	39.8	10.6	40.48	44.7
11.8	50.01	42.4	11.1	51.43	12.6	11.5	27.91	40.1	11.6	40.87	45.1
12.8	51.01	42.4	12.0	51.42	12.3	12.5	27.88	40.5	12.6	41.18	45.4
13.8	51.95	42.3	13.0	51.43	12.0	13.5	27.83	40.8	13.6	41.43	45.7
14.8	52.85	42.3	14.0	51.46	11.7	14.5	27.78	41.1	14.6	41.63	46.0
15.8	53.70	42.3	15.0	51.50	11.4	15.5	27.73	41.4	15.6	41.83	46.3
16.8	54.50	42.3	16.0	51.53	11.1	16.5	27.68	41.7	16.6	42.04	46.6
17.8	55.30	42.2	17.0	51.53	10.9	17.5	27.65	41.9	17.6	42.29	46.8
18.8	56.12	42.2	18.0	51.52	10.6	18.5	27.62	42.2	18.6	42.58	47.1
19.8	56.95	42.1	19.0	51.50	10.3	19.5	27.61	42.5	19.6	42.90	47.4
20.8	57.83	42.0	20.0	51.45	10.0	20.5	27.60	42.8	20.6	43.25	47.7
21.8	58.77	42.0	21.0	51.41	9.7	21.5	27.58	43.1	21.6	43.61	48.0
22.8	59.77	41.9	22.0	51.38	9.4	22.5	27.53	43.5	22.6	43.95	48.3
23.8	60.80	41.9	23.0	51.37	9.1	23.5	27.48	43.8	23.6	44.23	48.6
24.8	61.84	41.8	24.0	51.39	8.7	24.5	27.40	44.2	24.6	44.43	49.0
25.8	62.89	41.8	25.0	51.45	8.4	25.5	27.31	44.5	25.6	44.56	49.3
26.8	63.92	41.9	26.0	51.53	8.1	26.5	27.19	44.9	26.6	44.62	49.7
27.8	64.90	41.9	27.0	51.63	7.7	27.5	27.06	45.2	27.6	44.61	50.0
28.8	65.81	42.0	28.0	51.74	7.4	28.5	26.93	45.5	28.6	44.57	50.3
29.8	66.69	42.0	29.0	51.86	7.1	29.5	26.81	45.7	29.6	44.52	50.6
30.8	67.52	42.0	30.0	51.97	6.9	30.5	26.69	46.0	30.6	44.49	50.9
31.8	68.35	42.1	31.0	52.06	6.6	31.5	26.58	46.3	31.6	44.49	51.2

CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Ursæ Minoris. (*Polaris.*)		Mean Solar Date.	51 Cephei (Hev.)		Mean Solar Date.	δ Ursæ Minoris.		Mean Solar Date.	λ Ursæ Minoris.	
	Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*
July	$1^{h}\ 18^{m}$	$+88^{\circ}\ 42'$	July	$6^{h}\ 47^{m}$	$+87^{\circ}\ 12'$	July	$18^{h}\ 8^{m}$	$+86^{\circ}\ 36'$	July	$19^{h}\ 35^{m}$	$+88^{\circ}\ 57'$
1.8	$8^{s}.35$	$42''.1$	1.0	$52^{s}.06$	$66''.6$	1.5	$26^{s}.58$	$46''.3$	1.6	$44^{s}.49$	$51''.2$
2.8	9.19	42.1	2.0	52.14	66.3	2.5	26.48	46.5	2.6	44.53	51.5
3.8	10.06	42.1	3.0	52.21	66.1	3.5	26.37	46.8	3.6	44.59	51.8
4.8	10.99	42.1	4.0	52.28	65.8	4.5	26.26	47.1	4.5	44.67	52.1
5.8	12.00	42.1	5.0	52.35	65.5	5.5	26.15	47.4	5.5	44.74	52.4
6.8	13.04	42.1	6.0	52.44	65.2	6.5	26.02	47.8	6.5	44.76	52.7
7.8	14.10	42.2	7.0	52.56	64.8	7.5	25.87	48.1	7.5	44.72	53.1
8.7	15.19	42.2	8.0	52.71	64.5	8.5	25.70	48.4	8.5	44.59	53.5
9.7	16.24	42.3	9.0	52.90	64.1	9.5	25.51	48.8	9.5	44.38	53.8
10.7	17.27	42.4	10.0	53.11	63.8	10.5	25.29	49.1	10.5	44.10	54.2
11.7	18.24	42.6	11.0	53.34	63.5	11.5	25.07	49.4	11.5	43.78	54.5
12.7	19.15	42.7	12.0	53.57	63.2	12.5	24.85	49.6	12.5	43.43	54.9
13.7	20.03	42.8	13.0	53.80	62.9	13.5	24.63	49.9	13.5	43.07	55.2
14.7	20.85	42.9	14.0	54.02	62.7	14.4	24.43	50.1	14.5	42.77	55.4
15.7	21.67	43.0	15.0	54.23	62.4	15.4	24.23	50.3	15.5	42.49	55.7
16.7	22.53	43.1	16.0	54.42	62.1	16.4	24.05	50.6	16.5	42.25	56.0
17.7	23.41	43.2	17.0	54.58	61.9	17.4	23.88	50.9	17.5	42.04	56.3
18.7	24.34	43.3	17.9	54.75	61.6	18.4	23.70	51.1	18.5	41.85	56.6
19.7	25.32	43.4	18.9	54.92	61.3	19.4	23.50	51.4	19.5	41.65	57.0
20.7	26.34	43.5	19.9	55.10	61.0	20.4	23.29	51.7	20.5	41.40	57.3
21.7	27.38	43.6	20.9	55.30	60.7	21.4	23.06	52.0	21.5	41.10	57.7
22.7	28.41	43.7	21.9	55.55	60.4	22.4	22.82	52.3	22.5	40.72	58.0
23.7	29.43	43.9	22.9	55.84	60.0	23.4	22.55	52.6	23.5	40.25	58.4
24.7	30.39	44.1	23.9	56.14	59.7	24.4	22.27	52.9	24.5	39.73	58.7
25.7	31.29	44.2	24.9	56.45	59.4	25.4	21.98	53.1	25.5	39.16	59.0
26.7	32.14	44.4	25.9	56.76	59.2	26.4	21.70	53.3	26.5	38.57	59.3
27.7	32.95	44.6	26.9	57.06	58.9	27.4	21.42	53.5	27.5	37.99	59.6
28.7	33.73	44.8	27.9	57.36	58.7	28.4	21.15	53.8	28.5	37.43	59.9
29.7	34.51	45.0	28.9	57.64	58.5	29.4	20.90	54.0	29.5	36.91	60.2
30.7	35.30	45.1	29.9	57.91	58.2	30.4	20.65	54.2	30.5	36.43	60.5
31.7	36.14	45.2	30.9	58.16	58.0	31.4	20.40	54.4	31.5	35.97	60.8
32.7	37.04	45.4	31.9	58.41	57.7	32.4	20.14	54.6	32.5	35.51	61.1
			32.9	58.67	57.5						

CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Ursæ Minoris. (*Polaris.*)		Mean Solar Date.	51 Cephei (Hev.)		Mean Solar Date.	δ Ursæ Minoris.		Mean Solar Date.	λ Ursæ Minoris.	
	Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*
Aug.	h m 1 18	+88° 42′	Aug.	h m 6 47	+87° 12′	Aug.	h m 18 8	+86° 36′	Aug.	h m 19 35	+88° 58′
	s	″		s	″		s	″		s	″
1.7	37.04	45.4	1.9	58.67	57.5	1.4	20.14	54.6	1.5	35.51	1.1
2.7	37.97	45.6	2.9	58.97	57.2	2.4	19.86	54.9	2.5	35.02	1.4
3.7	38.94	45.7	3.9	59.29	56.9	3.4	19.57	55.2	3.5	34.47	1.7
4.7	39.93	46.0	4.9	59.63	56.6	4.4	19.26	55.4	4.5	33.84	2.0
5.7	40.90	46.2	5.9	60.01	56.3	5.4	18.93	55.7	5.5	33.14	2.4
6.7	41.85	46.4	6.9	60.42	56.0	6.4	18.58	55.9	6.5	32.37	2.7
7.7	42.74	46.7	7.9	60.85	55.8	7.4	18.21	56.1	7.5	31.53	3.0
8.7	43.57	46.9	8.9	61.26	55.6	8.4	17.85	56.3	8.5	30.66	3.4
9.7	44.33	47.2	9.9	61.66	55.4	9.4	17.49	56.5	9.5	29.79	3.6
10.7	45.04	47.5	10.9	62.04	55.2	10.4	17.15	56.6	10.4	28.94	3.9
11.7	45.73	47.7	11.9	62.41	55.0	11.4	16.82	56.8	11.4	28.13	4.1
12.7	46.43	47.9	12.9	62.76	54.8	12.4	16.50	57.0	12.4	27.35	4.4
13.6	47.16	48.1	13.9	63.08	54.6	13.4	16.18	57.1	13.4	26.63	4.6
14.6	47.92	48.3	14.9	63.42	54.3	14.4	15.88	57.3	14.4	25.94	4.9
15.6	48.73	48.5	15.9	63.76	54.1	15.4	15.57	57.5	15.4	25.24	5.2
16.6	49.58	48.8	16.9	64.13	53.8	16.4	15.24	57.7	16.4	24.52	5.5
17.6	50.47	49.0	17.9	64.52	53.6	17.4	14.89	57.9	17.4	23.74	5.8
18.6	51.35	49.3	18.9	64.94	53.3	18.3	14.53	58.1	18.4	22.90	6.1
19.6	52.19	49.6	19.9	65.38	53.1	19.3	14.15	58.3	19.4	21.97	6.4
20.6	53.01	49.9	20.9	65.84	52.9	20.3	13.76	58.5	20.4	20.98	6.7
21.6	53.75	50.2	21.9	66.31	52.7	21.3	13.37	58.7	21.4	19.94	7.0
22.6	54.43	50.5	22.8	66.78	52.5	22.3	12.97	58.8	22.4	18.88	7.2
23.6	55.06	50.8	23.8	67.23	52.3	23.3	12.58	58.9	23.4	17.82	7.5
24.6	55.65	51.1	24.8	67.67	52.2	24.3	12.19	59.0	24.4	16.78	7.7
25.6	56.23	51.3	25.8	68.09	52.0	25.3	11.82	59.1	25.4	15.79	7.9
26.6	56.81	51.6	26.8	68.49	51.9	26.3	11.47	59.2	26.4	14.84	8.1
27.6	57.42	51.9	27.8	68.88	51.7	27.3	11.12	59.3	27.4	13.91	8.3
28.6	58.07	52.1	28.8	69.29	51.5	28.3	10.76	59.5	28.4	13.00	8.6
29.6	58.77	52.4	29.8	69.71	51.3	29.3	10.40	59.6	29.4	12.07	8.8
30.6	59.51	52.7	30.8	70.15	51.1	30.3	10.01	59.7	30.4	11.11	9.1
31.6	60.25	53.0	31.8	70.62	50.9	31.3	9.61	59.9	31.4	10.09	9.4
32.6	60.99	53.3	32.8	71.13	50.7	32.3	9.20	60.0	32.4	8.99	9.6

CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Ursæ Minoris. (*Polaris.*)		Mean Solar Date.	51 Cephei (Hev.)		Mean Solar Date.	δ Ursæ Minoris.		Mean Solar Date.	λ Ursæ Minoris.	
	Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*
Sept.	h m 1 19	° ′ +88 42	Sept.	h m 6 48	° ′ +87 12	Sept.	h m 18 7	° ′ +86 37	Sept.	h m 19 34	° ′ +88 58
	s	″		s	″		s	″		s	″
1.6	0.99	53.3	1.8	11.13	50.7	1.3	69.20	0.0	1.4	68.99	9.6
2.6	1.71	53.7	2.8	11.66	50.5	2.3	68.77	0.2	2.4	67.81	9.9
3.6	2.38	54.0	3.8	12.20	50.4	3.3	68.33	0.3	3.4	66.58	10.1
4.6	2.98	54.4	4.8	12.74	50.2	4.3	67.88	0.4	4.4	65.30	10.4
5.6	3.52	54.7	5.8	13.27	50.1	5.3	67.43	0.4	5.4	64.02	10.6
6.6	4.01	55.1	6.8	13.79	50.0	6.3	67.00	0.5	6.4	62.76	10.8
7.6	4.45	55.4	7.8	14.28	49.9	7.3	66.59	0.5	7.4	61.53	11.0
8.6	4.88	55.8	8.8	14.75	49.8	8.3	66.18	0.6	8.4	60.35	11.1
9.6	5.34	56.1	9.8	15.20	49.7	9.3	65.79	0.6	9.4	59.21	11.3
10.6	5.81	56.4	10.8	15.65	49.6	10.3	65.41	0.7	10.4	58.12	11.5
11.6	6.31	56.7	11.8	16.09	49.5	11.3	65.03	0.7	11.4	57.04	11.7
12.6	6.87	57.0	12.8	16.55	49.3	12.3	64.64	0.8	12.4	55.96	11.9
13.6	7.46	57.3	13.8	17.03	49.2	13.3	64.24	0.9	13.4	54.85	12.1
14.6	8.06	57.7	14.8	17.54	49.0	14.3	63.82	1.0	14.4	53.68	12.3
15.5	8.62	58.0	15.8	18.08	48.9	15.3	63.39	1.1	15.4	52.43	12.5
16.6	9.16	58.4	16.8	18.63	48.8	16.3	62.94	1.1	16.4	51.12	12.7
17.6	9.63	58.8	17.8	19.19	48.7	17.3	62.48	1.2	17.3	49.74	12.9
18.6	10.04	59.2	18.8	19.74	48.6	18.3	62.02	1.2	18.3	48.35	13.1
19.5	10.39	59.6	19.8	20.28	48.6	19.3	61.58	1.2	19.3	46.97	13.2
20.5	10.66	59.9	20.8	20.81	48.5	20.3	61.14	1.1	20.3	45.59	13.3
21.5	10.93	60.3	21.8	21.32	48.5	21.3	60.72	1.1	21.3	44.25	13.5
22.5	11.19	60.6	22.8	21.81	48.4	22.3	60.31	1.1	22.3	42.96	13.6
23.5	11.46	61.0	23.8	22.28	48.4	23.2	59.91	1.1	23.3	41.73	13.7
24.5	11.76	61.3	24.8	22.74	48.3	24.2	59.51	1.1	24.3	40.53	13.8
25.5	12.13	61.7	25.8	23.22	48.3	25.2	59.11	1.1	25.3	39.32	13.9
26.5	12.52	62.0	26.7	23.73	48.2	26.2	58.70	1.1	26.3	38.08	14.1
27.5	12.93	62.3	27.7	24.26	48.1	27.2	58.28	1.1	27.3	36.80	14.2
28.5	13.34	62.7	28.7	24.81	48.0	28.2	57.84	1.1	28.3	35.45	14.4
29.5	13.73	63.1	29.7	25.39	47.9	29.2	57.38	1.1	29.3	34.04	14.6
30.5	14.08	63.5	30.7	25.98	47.9	30.2	56.91	1.1	30.3	32.56	14.7
31.5	14.36	64.0	31.7	26.58	47.8	31.2	56.43	1.1	31.3	31.04	14.8

CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Ursæ Minoris. (*Polaris.*)		Mean Solar Date.	51 Cephei (Hev.)		Mean Solar Date.	δ Ursæ Minoris.		Mean Solar Date.	λ Ursæ Minoris.	
	Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′
Oct.	1 19	+88 43	Oct.	6 48	+87 12	Oct.	18 7	+86 36	Oct	19 33	+88 58
	s	″		s	″		s	″		s	″
1.5	14.36	4.0	1.7	26.58	47.8	1.2	56.43	61.1	1.3	91.04	14.8
2.5	14.58	4.4	2.7	27.17	47.8	2.2	55.96	61.0	2.3	89.50	14.9
3.5	14.72	4.8	3.7	27.75	47.8	3.2	55.51	60.9	3.3	87.99	15.0
4.5	14.82	5.2	4.7	28.29	47.9	4.2	55.07	60.8	4.3	86.52	15.1
5.5	14.89	5.6	5.7	28.81	47.9	5.2	54.65	60.7	5.3	85.09	15.1
6.5	14.96	5.9	6.7	29.31	47.9	6.2	54.24	60.7	6.3	83.73	15.2
7.5	15.06	6.3	7.7	29.79	47.9	7.2	53.85	60.6	7.3	82.41	15.2
8.5	15.19	6.6	8.7	30.27	47.9	8.2	53.46	60.5	8.3	81.13	15.3
9.5	15.36	7.0	9.7	30.76	47.9	9.2	53.07	60.4	9.3	79.86	15.3
10.5	15.57	7.3	10.7	31.27	47.9	10.2	52.67	60.4	10.3	78.58	15.4
11.5	15.79	7.7	11.7	31.80	47.9	11.2	52.26	60.3	11.3	77.24	15.5
12.5	15.99	8.1	12.7	32.35	47.9	12.2	51.84	60.3	12.3	75.85	15.6
13.5	16.17	8.5	13.7	32.92	47.9	13.2	51.41	60.2	13.3	74.39	15.7
14.5	16.28	8.9	14.7	33.50	47.9	14.2	50.97	60.1	14.3	72.89	15.8
15.5	16.34	9.3	15.7	34.08	47.9	15.2	50.52	60.0	15.3	71.36	15.8
16.5	16.33	9.7	16.7	34.65	48.0	16.2	50.08	59.9	16.3	69.82	15.8
17.5	16.26	10.1	17.7	35.20	48.1	17.2	49.65	59.7	17.3	68.31	15.8
18.5	16.12	10.5	18.7	35.72	48.2	18.2	49.25	59.6	18.3	66.83	15.8
19.5	15.98	10.9	19.7	36.22	48.3	19.2	48.86	59.4	19.3	65.40	15.8
20.5	15.86	11.3	20.7	36.71	48.4	20.2	48.48	59.2	20.3	64.04	15.8
21.5	15.74	11.6	21.7	37.19	48.4	21.2	48.12	59.1	21.3	62.73	15.8
22.5	15.68	12.0	22.7	37.66	48.5	22.2	47.75	59.0	22.2	61.44	15.8
23.5	15.67	12.3	23.7	38.14	48.5	23.2	47.39	58.8	23.2	60.13	15.8
24.5	15.68	12.7	24.7	38.65	48.6	24.2	47.01	58.7	24.2	58.80	15.8
25.5	15.69	13.1	25.7	39.18	48.6	25.2	46.61	58.6	25.2	57.42	15.8
26.4	15.68	13.5	26.7	39.74	48.7	26.2	46.20	58.5	26.2	55.97	15.9
27.4	15.64	13.9	27.7	40.31	48.7	27.2	45.78	58.3	27.2	54.46	15.9
28.4	15.54	14.3	28.7	40.89	48.8	28.2	45.36	58.2	28.2	52.92	15.9
29.4	15.37	14.7	29.7	41.47	49.0	29.2	44.94	58.0	29.2	51.37	15.9
30.4	15.14	15.1	30.7	42.03	49.1	30.2	44.53	57.8	30.2	49.83	15.8
31.4	14.83	15.5	31.7	42.55	49.2	31.2	44.14	57.6	31.2	48.32	15.8
32.4	14.50	15.9	32.7	43.04	49.4	32.1	43.77	57.3	32.2	46.87	15.7

CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Ursæ Minoris. (*Polaris.*)		Mean Solar Date.	51 Cephei (Hev.)		Mean Solar Date.	δ Ursæ Minoris.		Mean Solar Date.	λ Ursæ Minoris.	
	Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*
Nov.	$1^h\ 19^m$	$+88^\circ\ 43'$	Nov.	$6^h\ 48^m$	$+87^\circ\ 12'$	Nov.	$18^h\ 7^m$	$+86^\circ\ 36'$	Nov.	$19^h\ 33^m$	$+88^\circ\ 58'$
	s	″		s	″		s	″		s	″
1.4	14.50	15.9	1.7	43.04	49.4	1.1	43.77	57.3	1.2	46.87	15.7
2.4	14.17	16.3	2.7	43.51	49.5	2.1	43.41	57.1	2.2	45.48	15.6
3.4	13.85	16.6	3.7	43.96	49.7	3.1	43.08	56.9	3.2	44.17	15.5
4.4	13.55	17.0	4.7	44.40	49.8	4.1	42.76	56.7	4.2	42.90	15.5
5.4	13.28	17.3	5.6	44.83	50.0	5.1	42.45	56.5	5.2	41.65	15.4
6.4	13.04	17.6	6.6	45.28	50.1	6.1	42.13	56.3	6.2	40.41	15.4
7.4	12.83	17.9	7.6	45.75	50.2	7.1	41.79	56.1	7.2	39.14	15.3
8.4	12.63	18.3	8.6	46.24	50.3	8.1	41.45	55.9	8.2	37.83	15.3
9.4	12.40	18.7	9.6	46.75	50.4	9.1	41.10	55.7	9.2	36.48	15.2
10.4	12.13	19.0	10.6	47.26	50.6	10.1	40.74	55.5	10.2	35.08	15.2
11.4	11.79	19.4	11.6	47.77	50.7	11.1	40.38	55.3	11.2	33.64	15.1
12.4	11.37	19.8	12.6	48.27	50.9	12.1	40.03	55.0	12.2	32.19	15.0
13.4	10.89	20.1	13.6	48.75	51.1	13.1	39.69	54.8	13.2	30.77	14.9
14.4	10.37	20.5	14.6	49.20	51.3	14.1	39.37	54.5	14.2	29.39	14.7
15.4	9.81	20.8	15.6	49.63	51.6	15.1	39.07	54.2	15.2	28.07	14.6
16.4	9.26	21.2	16.6	50.03	51.8	16.1	38.79	53.9	16.2	26.81	14.4
17.4	8.73	21.5	17.6	50.41	52.0	17.1	38.53	53.6	17.2	25.62	14.3
18.4	8.22	21.8	18.6	50.79	52.2	18.1	38.27	53.4	18.2	24.47	14.1
19.4	7.77	22.1	19.6	51.18	52.4	19.1	38.01	53.1	19.2	23.35	14.0
20.4	7.36	22.4	20.6	51.58	52.6	20.1	37.74	52.9	20.2	22.20	13.9
21.4	6.95	22.7	21.6	51.99	52.7	21.1	37.46	52.7	21.2	21.02	13.8
22.4	6.54	23.0	22.6	52.44	52.9	22.1	37.18	52.4	22.2	19.80	13.7
23.4	6.10	23.3	23.6	52.90	53.1	23.1	36.89	52.2	23.2	18.52	13.6
24.4	5.61	23.7	24.6	53.36	53.3	24.1	36.59	51.9	24.2	17.20	13.5
25.4	5.05	24.0	25.6	53.82	53.5	25.1	36.29	51.6	25.2	15.87	13.3
26.4	4.43	24.4	26.6	54.26	53.8	26.1	36.00	51.3	26.2	14.54	13.1
27.4	3.75	24.7	27.6	54.68	54.1	27.1	35.73	51.0	27.2	13.25	12.9
28.4	3.02	25.0	28.6	55.07	54.3	28.1	35.48	50.6	28.2	12.03	12.7
29.4	2.27	25.3	29.6	55.43	54.6	29.1	35.25	50.3	29.1	10.88	12.5
30.4	1.52	25.6	30.6	55.75	54.9	30.1	35.04	50.0	30.1	9.80	12.3
31.3	0.81	25.8	31.6	56.05	55.2	31.1	34.86	49.6	31.1	8.79	12.1

CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Ursæ Minoris. (*Polaris.*)		Mean Solar Date.	51 Cephei (Hev.)		Mean Solar Date.	δ Ursæ Minoris.		Mean Solar Date.	λ Ursæ Minoris.	
	Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*		Right Ascension.	Declination *North.*
Dec.	$1^{h}\ 18^{m}$	$+88^{\circ}\ 43'$	Dec.	$6^{h}\ 48^{m}$	$+87^{\circ}\ 12'$	Dec.	$18^{h}\ 7^{m}$	$+86^{\circ}\ 36'$	Dec.	$19^{h}\ 32^{m}$	$+88^{\circ}\ 58'$
1.3	$60^{s}.81$	$25''.8$	1.6	$56^{s}.05$	$55''.2$	1.1	$34^{s}.86$	$49''.6$	1.1	$68^{s}.79$	$12''.1$
2.3	60.14	26.1	2.6	56.34	55.4	2.1	34.69	49.3	2.1	67.83	11.9
3.3	59.50	26.3	3.6	56.64	55.6	3.1	34.51	49.1	3.1	66.90	11.7
4.3	58.91	26.6	4.6	56.95	55.9	4.1	34.32	48.8	4.1	65.96	11.5
5.3	58.31	26.8	5.6	57.27	56.1	5.1	34.13	48.5	5.1	64.99	11.3
6.3	57.71	27.1	6.6	57.63	56.3	6.0	33.94	48.2	6.1	63.98	11.2
7.3	57.07	27.3	7.6	57.98	56.6	7.0	33.74	47.9	7.1	62.92	11.0
8.3	56.38	27.6	8.6	58.33	56.9	8.0	33.53	47.6	8.1	61.84	10.8
9.3	55.61	27.9	9.6	58.68	57.2	9.0	33.33	47.3	9.1	60.76	10.6
10.3	54.78	28.2	10.5	59.01	57.5	10.0	33.14	46.9	10.1	59.70	10.3
11.3	53.91	28.4	11.5	59.31	57.8	11.0	32.97	46.5	11.1	58.68	10.0
12.3	52.99	28.7	12.5	59.59	58.1	12.0	32.82	46.2	12.1	57.72	9.8
13.3	52.07	28.9	13.5	59.83	58.5	13.0	32.69	45.8	13.1	56.84	9.5
14.3	51.18	29.1	14.5	60.04	58.8	14.0	32.59	45.4	14.1	56.03	9.2
15.3	50.31	29.3	15.5	60.24	59.1	15.0	32.50	45.1	15.1	55.27	8.9
16.3	49.49	29.4	16.5	60.44	59.3	16.0	32.41	44.8	16.1	54.55	8.7
17.3	48.72	29.6	17.5	60.65	59.6	17.0	32.32	44.4	17.1	53.84	8.4
18.3	47.97	29.8	18.5	60.87	59.9	18.0	32.22	44.1	18.1	53.12	8.2
19.3	47.24	30.0	19.5	61.11	60.1	19.0	32.11	43.8	19.1	52.36	8.0
20.3	46.49	30.2	20.5	61.37	60.4	20.0	31.99	43.5	20.1	51.55	7.8
21.3	45.72	30.4	21.5	61.64	60.7	21.0	31.87	43.2	21.1	50.71	7.5
22.3	44.89	30.6	22.5	61.91	61.0	22.0	31.75	42.9	22.1	49.86	7.3
23.3	43.98	30.8	23.5	62.16	61.3	23.0	31.64	42.5	23.1	49.01	7.0
24.3	43.01	31.0	24.5	62.37	61.7	24.0	31.54	42.1	24.1	48.19	6.7
25.3	41.99	31.2	25.5	62.56	62.1	25.0	31.47	41.7	25.1	47.43	6.4
26.3	40.96	31.4	26.5	62.72	62.4	26.0	31.43	41.4	26.1	46.74	6.1
27.3	39.93	31.5	27.5	62.85	62.8	27.0	31.40	41.0	27.1	46.14	5.8
28.3	38.92	31.6	28.5	62.95	63.1	28.0	31.39	40.6	28.1	45.62	5.4
29.3	37.97	31.7	29.5	63.03	63.4	29.0	31.40	40.2	29.1	45.18	5.1
30.3	37.06	31.8	30.5	63.11	63.7	30.0	31.42	39.9	30.1	44.76	4.8
31.3	36.18	31.9	31.5	63.19	64.0	31.0	31.43	39.6	31.1	44.36	4.5
32.3	35.33	32.0	32.5	63.29	64.3	32.0	31.43	39.3	32.1	43.95	4.3

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Andromedæ.		γ Pegasi. (*Algenib.*)		β Hydri.		12 Ceti.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *South.*
	h m 0 2	+28° 28′	h m 0 7	+14° 33′	h m 0 19	−77° 52′	h m 0 24	− 4° 33′
	s	″	s	″	s	″	s	″
(Dec.30.2)	37.98 −.14	41.3 −0.8	30.13 −.12	56.4 −0.8	51.86− .90	72.8 +0.7	21.38 −.11	84.0 −0.7
Jan. 9.2	37.83 .14	40.3 1.1	30.01 .12	55.5 0.9	50.98 .85	71.8 1.3	21.26 .11	84.7 0.6
19.2	37.70 .13	39.1 1.3	29.90 .11	54.6 1.0	50.16 .78	70.2 1.9	21.15 .11	85.2 0.5
29.2	37.57 .12	37.7 1.5	29.79 .10	53.5 1.1	49.42 .69	68.0 2.4	21.05 .10	85.6 0.3
Feb. 8.1	37.46 .10	36.1 1.6	29.70 .08	52.4 1.0	48.78 .57	65.4 2.8	20.96 .08	85.9 −0.2
18.1	37.38 −.07	34.5 −1.6	29.64 −.05	51.4 −1.0	48.27− .45	62.3 +3.2	20.89 −.06	86.0 0.0
28.1	37.33 −.03	32.9 1.6	29.60 −.02	50.5 0.9	47.89 .31	58.9 3.5	20.84 −.03	85.9 +0.2
Mar. 10.0	37.32 +.01	31.3 1.5	29.59 +.01	49.6 0.7	47.66− .16	55.3 3.7	20.82 .00	85.6 0.4
20.0	37.35 .05	29.9 1.3	29.61 .05	49.0 0.5	47.58 .00	51.6 3.8	20.83 +.03	85.1 0.6
30.0	37.42 .10	28.7 1.1	29.68 .09	48.6 −0.3	47.66+ .15	47.7 3.8	20.88 .07	84.3 0.9
Apr. 9.0	37.54 +.14	27.7 −0.8	29.79 +.13	48.5 0.0	47.89+ .31	43.9 +3.8	20.97 +.11	83.3 +1.1
18.9	37.70 .19	27.1 −0.4	29.94 .17	48.7 +0.3	48.28 .47	40.2 3.6	21.10 .15	82.0 1.4
28.9	37.91 .23	26.9 0.0	30.13 .21	49.1 0.6	48.82 .61	36.6 3.4	21.27 .19	80.6 1.6
May 8.9	38.16 .27	27.1 +0.4	30.36 .24	50.0 1.0	49.51 .75	33.3 3.1	21.48 .23	78.9 1.8
18.8	38.45 .30	27.6 0.8	30.62 .27	51.1 1.3	50.32 .87	30.3 2.8	21.72 .26	77.0 1.9
28.8	38.78 +.32	28.6 +1.1	30.90 +.30	52.5 +1.5	51.24+ .97	27.7 +2.4	21.99 +.28	75.0 +2.0
June 7.8	39.08 .33	29.9 1.5	31.21 .31	54.1 1.7	52.26 1.05	25.6 1.9	22.28 .30	73.0 2.1
17.8	39.42 .34	31.5 1.8	31.53 .32	56.0 1.9	53.34 1.10	23.9 1.4	22.59 .31	70.9 2.1
27.7	39.76 .33	33.5 2.0	31.85 .32	58.0 2.1	54.46 1.13	22.8 0.9	22.91 .31	68.9 2.0
July 7.7	40.09 .32	35.6 2.2	32.16 .31	60.1 2.1	55.59 1.12	22.2 +0.3	23.22 .31	66.9 1.9
17.7	40.41 +.30	37.9 +2.4	32.46 +.29	62.2 +2.1	56.71+1.09	22.2 −0.3	23.52 +.29	65.0 +1.8
27.7	40.70 .27	40.3 2.5	32.74 .26	64.4 2.1	57.77 1.03	22.8 0.9	23.81 .27	63.4 1.6
Aug. 6.6	40.95 .24	42.9 2.5	32.99 .23	66.5 2.0	58.76 .93	23.9 1.4	24.07 .25	61.9 1.3
16.6	41.18 .20	45.3 2.5	33.20 .20	68.5 1.9	59.64 .81	25.5 1.9	24.30 .22	60.7 1.1
26.6	41.36 .17	47.8 2.4	33.39 .16	70.3 1.8	60.38 .66	27.7 2.3	24.50 .18	59.7 0.8
Sept. 5.5	41.51 +.12	50.2 +2.3	33.53 +.13	72.0 +1.6	60.96+ .49	30.1 −2.6	24.66 +.14	59.1 +0.5
15.5	41.62 .08	52.4 2.2	33.64 .09	73.5 1.4	61.36 .31	33.0 2.9	24.78 .11	58.7 +0.3
25.5	41.67 .04	54.5 2.0	33.71 .05	74.8 1.2	61.58+ .12	35.9 3.0	24.87 .07	58.5 0.0
Oct. 5.5	41.70 +.01	56.3 1.7	33.74 +.02	75.9 0.9	61.61− .07	39.0 3.1	24.92 +.04	58.6 −0.2
15.4	41.69 −.03	57.9 1.5	33.74 −.01	76.7 0.7	61.44 .25	42.0 3.0	24.94 .00	58.9 0.4
25.4	41.65 −.05	59.3 +1.2	33.71 −.04	77.3 +0.5	61.10− .42	44.9 −2.7	24.93 −.03	59.4 −0.6
Nov. 4.4	41.58 .08	60.4 0.9	38.66 .06	77.7 0.3	60.60 .57	47.5 2.4	24.89 .05	60.0 0.7
14.4	41.49 .10	61.2 0.6	33.59 .08	77.9 +0.1	59.95 .70	49.7 2.0	24.83 .07	60.7 0.7
24.3	41.38 .12	61.7 +0.3	33.50 .10	77.8 −0.1	59.19 .80	51.5 1.5	24.76 .08	61.5 0.8
Dec. 4.3	41.26 .13	61.8 0.0	33.40 .11	77.6 0.3	58.35 .87	52.6 0.8	24.67 .10	62.3 0.8
14.3	41.12 −.14	61.7 −0.3	33.28 −.11	77.1 −0.5	57.45− .90	53.1 −0.3	24.57 −.10	63.0 −0.8
24.2	40.98 .14	61.2 0.6	33.17 .11	76.5 0.7	56.54 .91	53.1 +0.4	24.46 .11	63.8 0.7
34.2	40.84 −.14	60.5 −0.9	33.06 −.12	75.8 −0.8	55.64− .89	52.4 +1.0	24.35 −.11	64.4 −0.6

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Cassiopeæ.		β Ceti.		21 Cassiopeæ.		ε Piscium.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	$0^{h}\ 34^{m}$	$+55^{\circ}\ 55'$	$0^{h}\ 37^{m}$	$-18^{\circ}\ 35'$	$0^{h}\ 38^{m}$	$+74^{\circ}\ 22'$	$0^{h}\ 57^{m}$	$+\ 7^{\circ}\ 17'$
	s	″	s	″	s	″	s	″
(Dec.30.3)	11.99 −.30	51.6 −0.2	60.07 −.13	60.6 −0.6	19.13 −.72	64.8 +0.3	10.11 −.11	26.6 −0.6
Jan. 9.2	11.69 .30	51.2 0.7	59.94 .12	61.0 0.4	18.39 .73	64.7 −0.3	9.99 .12	25.9 0.7
19.2	11.40 .29	50.2 1.2	59.82 .12	61.3 −0.1	17.67 .71	64.1 0.9	9.87 .12	25.2 0.7
29.2	11.11 .27	48.8 1.6	59.70 .11	61.3 +0.2	16.97 .66	62.8 1.5	9.75 .12	24.5 0.7
Feb. 8.1	10.86 .24	47.0 2.0	59.60 .10	61.0 0.4	16.34 .59	61.1 2.0	9.64 .11	23.9 0.6
18.1	10.64 −.19	44.9 −2.3	59.51 −.08	60.4 +0.7	15.79 −.50	58.9 −2.4	9.54 −.09	23.3 −0.5
28.1	10.47 .14	42.5 2.5	59.44 .05	59.5 1.0	15.35 .37	56.3 2.7	9.46 .07	22.8 0.4
Mar. 10.1	10.36 .08	40.0 2.5	59.41 −.02	58.4 1.2	15.04 .24	53.5 2.9	9.40 −.04	22.5 0.3
20.1	10.31 −.01	37.4 2.5	59.40 +.02	57.1 1.5	14.87 −.09	50.5 3.0	9.38 .00	22.3 −0.1
30.0	10.34 +.07	35.0 2.4	59.44 .06	55.5 1.7	14.85 +.06	47.5 2.9	9.40 +.04	22.3 +0.2
Apr. 9.0	10.45 +.14	32.7 −2.2	59.51 +.10	53.6 +1.9	14.99 +.22	44.7 −2.8	9.46 +.08	22.6 +0.4
19.0	10.62 .21	30.6 1.9	59.63 .14	51.6 2.1	15.28 .36	42.0 2.5	9.56 .12	23.1 0.7
29.0	10.87 .28	29.0 1.5	59.79 .18	49.4 2.2	15.72 .50	39.7 2.1	9.70 .16	24.0 0.9
May 8.9	11.19 .34	27.7 1.0	59.99 .22	47.2 2.3	16.28 .61	37.8 1.7	9.88 .20	25.0 1.2
18.9	11.55 .39	26.9 0.5	60.23 .25	44.8 2.4	16.95 .71	36.3 1.2	10.11 .24	26.3 1.4
28.9	11.97 +.43	26.6 −0.1	60.50 +.28	42.4 +2.4	17.70 +.79	35.3 −0.7	10.36 +.27	27.8 +1.6
June 7.8	12.42 .46	26.8 +0.4	60.80 .30	40.1 2.3	18.52 .84	34.9 −0.1	10.64 .29	29.5 1.8
17.8	12.88 .47	27.5 0.9	61.11 .32	37.8 2.2	19.38 .87	35.0 +0.4	10.94 .30	31.4 1.9
27.8	13.36 .47	28.7 1.4	61.43 .32	35.7 2.0	20.26 .87	35.7 0.9	11.25 .31	33.4 2.0
July 7.8	13.83 .46	30.3 1.8	61.76 .32	33.8 1.8	21.13 .85	36.9 1.5	11.57 .31	35.3 2.0
17.7	14.28 +.44	32.3 +2.2	62.07 +.31	32.2 +1.5	21.96 +.81	38.6 +1.9	11.87 +.30	37.3 +2.0
27.7	14.71 .41	34.7 2.5	62.38 .29	30.8 1.2	22.75 .75	40.8 2.4	12.17 .29	39.3 1.9
Aug. 6.7	15.09 .37	37.4 2.8	62.66 .27	29.8 0.8	23.47 .68	43.4 2.8	12.45 .26	41.1 1.8
16.6	15.44 .32	40.3 3.0	62.91 .24	29.2 0.5	24.10 .59	46.3 3.1	12.70 .24	42.8 1.6
26.6	15.73 .27	43.4 3.1	63.13 .20	28.9 +0.1	24.64 .49	49.5 3.3	12.92 .21	44.3 1.4
Sept. 5.6	15.97 +.21	46.6 +3.2	63.31 +.16	28.9 −0.2	25.08 +.38	53.0 +3.5	13.11 +.17	45.6 +1.2
15.6	16.15 .15	49.8 3.2	63.45 .12	29.3 0.5	25.41 .27	56.5 3.6	13.26 .14	46.6 1.0
25.5	16.28 .10	53.1 3.2	63.56 .09	30.0 0.8	25.62 .15	60.2 3.7	13.38 .10	47.5 0.7
Oct. 5.5	16.34 +.04	56.2 3.1	63.62 .05	30.9 1.0	25.72 +.04	63.9 3.7	13.47 .07	48.1 0.5
15.5	16.36 −.01	59.2 2.9	63.65 +.01	32.0 1.2	25.70 −.08	67.5 3.5	13.52 .04	48.5 0.3
25.5	16.32 −.07	62.0 +2.7	63.65 −.02	33.3 −1.3	25.56 −.20	71.0 +3.3	13.54 +.01	48.7 +0.1
Nov. 4.4	16.22 .11	64.6 2.4	63.62 .05	34.6 1.3	25.31 .31	74.2 3.1	13.54 −.02	48.7 −0.1
14.4	16.09 .16	66.8 2.0	63.56 .07	35.9 1.3	24.94 .41	77.1 2.7	13.51 .04	48.6 0.2
24.4	15.91 .20	68.6 1.6	63.48 .09	37.2 1.2	24.48 .51	79.7 2.3	13.46 .06	48.3 0.3
Dec. 4.3	15.69 .23	70.0 1.2	63.38 .10	38.4 1.1	23.93 .59	81.7 1.8	13.39 .08	47.9 0.5
14.3	15.44 −.26	71.0 +0.7	63.27 −.11	39.4 −0.9	23.30 −.65	83.3 +1.3	13.30 −.09	47.3 −0.5
24.3	15.17 .28	71.4 +0.3	63.16 .12	40.3 0.7	22.62 .70	84.3 0.7	13.20 .11	46.8 0.6
34.3	14.88 −.29	71.3 −0.2	63.03 −.13	40.9 −0.5	21.91 −.73	84.7 +0.1	13.09 −.12	46.1 −0.7

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Andromedæ.		θ^1 Ceti.		38 Cassiopeæ.		η Piscium.	
	Right Ascension.	Declination *North*.	Right Ascension.	Declination *South*.	Right Ascension.	Declination *North*.	Right Ascension.	Declination *North*.
	h m 1 3	° ′ +35 1	h m 1 18	° ′ − 8 45	h m 1 22	° ′ +69 41	h m 1 25	° ′ +14 46
	s	″	s	″	s	″	s	″
(Dec. 30.3)	30.41 −.16	57.9 −0.2	27.77 −.12	34.4 −0.8	58.64 −.50	45.6 +0.8	31.98 −.12	20.6 −0.5
Jan. 9.3	30.25 .17	57.5 0.6	27.64 .12	35.1 0.6	58.12 .53	46.1 +0.2	31.86 .13	20.1 0.6
19.2	30.08 .17	56.8 0.9	27.52 .13	35.7 0.5	57.58 .54	46.0 −0.4	31.73 .13	19.4 0.7
29.2	29.90 .17	55.7 1.2	27.39 .13	36.0 0.3	57.04 .53	45.3 1.0	31.59 .13	18.7 0.7
Feb. 8.2	29.74 .15	54.4 1.4	27.27 .12	36.2 −0.1	56.52 .50	44.1 1.5	31.46 .13	17.9 0.8
18.1	29.60 −.13	53.0 −1.5	27.16 −.10	36.1 +0.2	56.04 −.45	42.3 −1.9	31.34 −.11	17.1 −0.8
28.1	29.48 .10	51.3 1.6	27.06 .08	35.9 0.4	55.63 .37	40.2 2.3	31.23 .09	16.4 0.7
Mar. 10.1	29.39 .06	49.7 1.6	26.99 .06	35.4 0.6	55.30 .28	37.8 2.6	31.15 .07	15.7 0.6
20.1	29.35 −.02	48.1 1.6	26.95 −.02	34.6 0.9	55.07 .17	35.1 2.7	31.10 −.03	15.2 0.5
30.0	29.35 +.03	46.5 1.4	26.94 +.01	33.6 1.1	54.96 −.06	32.3 2.8	31.09 +.01	14.8 0.3
Apr. 9.0	29.40 +.08	45.2 −1.3	26.97 +.05	32.4 +1.3	54.96 +.07	29.5 −2.7	31.12 +.05	14.6 −0.1
19.0	29.51 .13	44.1 0.9	27.05 .10	30.9 1.6	55.09 .19	26.9 2.5	31.19 .10	14.7 +0.2
29.0	29.67 .19	43.3 0.6	27.17 .14	29.3 1.8	55.34 .30	24.5 2.3	31.31 .14	14.9 0.4
May 8.9	29.88 .23	42.9 −0.3	27.33 .18	27.4 1.9	55.70 .41	22.4 1.9	31.48 .18	15.5 0.7
18.9	30.14 .27	42.8 +0.1	27.53 .22	25.4 2.1	56.16 .51	20.6 1.5	31.68 .22	16.4 1.0
28.9	30.43 +.31	43.1 +0.5	27.77 +.25	23.3 +2.2	56.70 +.58	19.4 −1.0	31.93 +.26	17.5 +1.3
June 7.8	30.75 .33	43.7 0.9	28.03 .28	21.1 2.2	57.32 .64	18.6 −0.5	32.20 .28	18.9 1.5
17.8	31.10 .35	44.8 1.2	28.32 .30	18.9 2.2	57.99 .68	18.3 0.0	32.50 .30	20.4 1.6
27.8	31.45 .36	46.2 1.5	28.63 .31	16.7 2.1	58.69 .71	18.5 +0.5	32.81 .32	22.2 1.8
July 7.8	31.81 .36	47.8 1.8	28.94 .31	14.7 2.0	59.41 .71	19.2 1.0	33.13 .32	24.0 1.9
17.7	32.17 +.35	49.8 +2.0	29.25 +.31	12.8 +1.8	60.12 +.70	20.5 +1.5	33.44 +.31	25.9 +1.9
27.7	32.51 .33	51.9 2.1	29.55 .30	11.1 1.6	60.81 .67	22.1 1.9	33.75 .30	27.9 1.9
Aug. 6.7	32.82 .30	54.2 2.2	29.84 .28	9.7 1.3	61.47 .63	24.3 2.3	34.05 .28	29.8 1.9
16.6	33.11 .27	56.6 2.4	30.11 .25	8.5 1.0	62.07 .58	26.7 2.6	34.32 .26	31.6 1.8
26.6	33.37 .24	59.0 2.4	30.34 .22	7.7 0.7	62.62 .51	29.5 2.9	34.56 .23	33.4 1.7
Sept. 5.6	33.58 +.20	61.4 +2.4	30.55 +.19	7.1 +0.4	63.09 +.44	32.6 +3.2	34.78 +.20	34.9 +1.5
15.6	33.77 .16	63.9 2.4	30.73 .16	6.9 +0.1	63.49 .36	35.9 3.3	34.96 .17	36.4 1.3
25.5	33.91 .12	66.2 2.3	30.87 .12	7.0 −0.2	63.81 .27	39.3 3.4	35.11 .13	37.6 1.1
Oct. 5.5	34.01 .08	68.4 2.1	30.97 .09	7.4 0.5	64.04 .18	42.8 3.5	35.23 .10	38.6 0.9
15.5	34.07 .05	70.4 1.9	31.04 .06	8.0 0.7	64.18 .10	46.2 3.4	35.31 .07	39.5 0.7
25.5	34.10 +.01	72.2 +1.7	31.08 +.03	8.7 −0.9	64.23 +.01	49.7 +3.3	35.37 +.04	40.1 +0.5
Nov. 4.4	34.10 −.02	73.8 1.5	31.09 .00	9.7 1.0	64.19 −.08	52.9 3.1	35.39 +.01	40.5 0.3
14.4	34.06 .05	75.2 1.2	31.08 −.03	10.7 1.0	64.06 .18	55.9 2.9	35.39 −.02	40.8 +0.2
24.4	33.99 .08	76.3 0.9	31.04 .05	11.7 1.1	63.83 .26	58.7 2.6	35.36 .04	40.9 0.0
Dec. 4.3	33.90 .11	77.0 0.6	30.98 .07	12.8 1.0	63.53 .34	61.0 2.1	35.30 .06	40.8 −0.1
14.3	33.78 −.13	77.5 +0.3	30.89 −.09	13.8 −0.9	63.15 −.41	62.9 +1.7	35.23 −.09	40.6 −0.3
24.3	33.64 .15	77.6 0.0	30.79 .10	14.7 0.8	62.71 .47	64.4 1.1	35.13 .10	40.3 0.4
34.3	33.49 −.16	77.4 −0.4	30.68 −.11	15.4 −0.7	62.22 −.51	65.2 +0.6	35.02 −.11	39.8 −0.5

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*a* Eridani. (*Achernar.*)		*o* Piscium.		*β* Arietis.		50 Cassiopeæ.	
	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m 1 33	° ′ −57 47	h m 1 39	° ′ + 8 35	h m 1 48	° ′ +20 15	h m 1 53	° ′ +71 52
	s	″	s	″	s	″	s	″
(Dec. 30.3)	34.02 −.32	87.9 −0.7	31.36 −.11	49.3 −0.6	29.99 −.11	52.4 −0.3	58.42 −.52	71.7 +1.2
Jan. 9.3	33.70 .32	88.3 −0.1	31.24 .12	48.7 0.6	29.86 .13	52.0 0.5	57.86 .57	72.7 0.6
19.2	33.37 .32	88.2 +0.4	31.11 .13	48.1 0.6	29.73 .14	51.5 0.6	57.26 .61	73.0 +0.1
29.2	33.05 .31	87.4 1.0	30.98 .13	47.4 0.6	29.58 .15	50.8 0.7	56.63 .62	72.8 −0.5
Feb. 8.2	32.74 .29	86.2 1.5	30.85 .13	46.8 0.6	29.43 .14	50.1 0.8	56.02 .60	72.0 1.1
18.1	32.46 −.27	84.4 +2.0	30.72 −.12	46.3 −0.5	29.29 −.13	49.2 −0.8	55.43 −.55	70.7 −1.6
28.1	32.21 .23	82.2 2.4	30.61 .10	45.8 0.4	29.16 .12	48.4 0.9	54.91 .48	68.9 2.0
Mar. 10.1	32.00 .18	79.5 2.8	30.52 .08	45.5 0.3	29.06 .09	47.5 0.8	54.47 .39	66.7 2.3
20.1	31.85 .12	76.6 3.1	30.46 −.04	45.3 −0.1	28.98 .06	46.7 0.7	54.13 .28	64.2 2.6
30.0	31.75 −.06	73.3 3.3	30.43 .00	45.3 +0.1	28.95 −.02	46.0 0.6	53.90 .16	61.5 2.7
Apr. 9.0	31.72 .00	69.9 +3.5	30.45 +.04	45.5 +0.3	28.95 +.03	45.6 −0.4	53.81 −.02	58.8 −2.7
19.0	31.76 +.07	66.3 3.6	30.51 .08	45.9 0.5	29.01 .08	45.3 −0.2	53.86 +.11	56.0 2.7
29.0	31.87 .14	62.7 3.6	30.61 .13	46.6 0.8	29.11 .12	45.2 +0.1	54.04 .25	53.4 2.5
May 8.9	32.05 .21	59.1 3.5	30.76 .17	47.5 1.0	29.26 .17	45.4 0.3	54.35 .37	51.1 2.2
18.9	32.29 .28	55.6 3.4	30.95 .21	48.6 1.3	29.45 .21	45.9 0.6	54.79 .49	49.1 1.8
28.9	32.61 +.34	52.3 +3.2	31.18 +.24	50.0 +1.5	29.68 +.25	46.6 +0.9	55.33 +.59	47.4 −1.4
June 7.8	32.97 .39	49.2 2.9	31.44 .27	51.5 1.6	29.95 .28	47.6 1.1	55.96 .67	46.2 1.0
17.8	33.38 .43	46.5 2.5	31.72 .29	53.2 1.8	30.24 .30	48.9 1.4	56.66 .73	45.5 −0.5
27.8	33.83 .46	44.1 2.1	32.03 .31	55.0 1.9	30.55 .32	50.4 1.6	57.42 .77	45.3 0.0
July 7.8	34.31 .48	42.3 1.6	32.34 .31	56.9 1.9	30.88 .32	52.0 1.7	58.20 .79	45.5 +0.5
17.7	34.80 +.49	40.9 +1.1	32.65 +.31	58.8 +1.9	31.20 +.32	53.8 +1.8	59.00 +.79	46.3 +1.0
27.7	35.28 .48	40.1 +0.6	32.95 .30	60.7 1.8	31.52 .31	55.6 1.9	59.79 .78	47.6 1.5
Aug. 6.7	35.75 .46	39.8 0.0	33.25 .28	62.5 1.7	31.83 .30	57.5 1.9	60.56 .75	49.2 1.9
16.6	36.19 .42	40.1 −0.6	33.52 .26	64.1 1.6	32.12 .28	59.4 1.8	61.28 .70	51.3 2.3
26.6	36.60 .38	41.0 1.1	33.77 .24	65.7 1.4	32.39 .25	61.2 1.8	61.96 .64	53.8 2.6
Sept. 5.6	36.95 +.33	42.4 −1.6	34.00 +.21	67.0 +1.2	32.62 +.22	62.9 +1.7	62.56 +.57	56.6 +2.9
15.6	37.25 .27	44.3 2.1	34.19 .18	68.1 1.0	32.83 .19	64.6 1.5	63.09 .49	59.7 3.2
25.5	37.48 .20	46.6 2.4	34.35 .14	69.0 0.8	33.01 .16	66.0 1.4	63.54 .40	62.9 3.3
Oct. 5.5	37.65 .13	49.2 2.7	34.48 .11	69.6 0.5	33.15 .13	67.3 1.2	63.89 .31	66.3 3.4
15.5	37.74 +.06	52.0 2.9	34.58 .08	70.0 0.3	33.27 .10	68.4 1.0	64.15 .21	69.7 3.4
25.5	37.76 −.01	55.0 −2.9	34.64 +.05	70.3 +0.2	33.35 +.06	69.4 +0.9	64.31 +.11	73.2 +3.4
Nov. 4.4	37.72 .08	57.8 2.8	34.68 +.02	70.4 0.0	33.40 .03	70.1 0.7	64.37 .00	76.6 3.3
14.4	37.61 .14	60.5 2.7	34.69 .00	70.3 −0.2	33.41 +.01	70.7 0.5	64.31 −.11	79.8 3.1
24.4	37.45 .19	63.0 2.4	34.67 −.03	70.0 0.3	33.41 −.02	71.1 0.3	64.15 .21	82.8 2.8
Dec. 4.3	37.23 .23	65.2 2.0	34.63 .05	69.7 0.4	33.37 .05	71.4 +0.1	63.89 .31	85.5 2.5
14.3	36.98 −.27	67.0 −1.5	34.57 −.07	69.2 −0.5	33.31 −.07	71.4 0.0	63.53 −.40	87.7 +2.1
24.3	36.69 .30	68.3 1.0	34.48 .09	68.7 0.5	33.22 .10	71.3 −0.2	63.09 .48	89.6 1.6
34.3	36.38 −.32	69.0 −0.5	34.38 −.11	68.2 −0.6	33.11 −.12	71.0 −0.3	62.57 −.55	90.9 +1.0

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Arietis.		ξ¹ Ceti.		ι Cassiopeæ.		ξ² Ceti.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	$2^{h}\ 0^{m}$	$+22°\ 56'$	$2^{h}\ 7^{m}$	$+\ 8°\ 19'$	$2^{h}\ 19^{m}$	$+66°\ 53'$	$2^{h}\ 22^{m}$	$+\ 7°\ 57'$
	s	″	s	″	s	″	s	″
(Dec.30.3)	54.55 −.11	12.6 −0.2	6.58 −.10	26.2 −0.5	55.78 −.37	78.7 +1.3	15.10 −.09	37.2 −0.6
Jan. 9.3	54.43 .13	12.3 0.4	6.47 .12	25.6 0.6	55.39 .42	79.8 0.8	15.00 .11	36.7 0.6
19.2	54.29 .15	11.9 0.5	6.35 .13	25.0 0.6	54.95 .45	80.4 +0.3	14.87 .13	36.1 0.5
29.2	54.14 .15	11.3 0.7	6.21 .14	24.5 0.6	54.48 .47	80.5 −0.2	14.74 .14	35.6 0.5
Feb. 8.2	53.98 .15	10.5 0.8	6.07 .14	23.9 0.5	54.00 .47	80.0 0.8	14.59 .15	35.1 0.5
18.2	53.83 −.14	9.7 −0.9	5.93 −.13	23.5 −0.4	53.53 −.45	78.9 −1.3	14.44 −.14	34.6 −0.4
28.2	53.69 .13	8.8 0.9	5.80 .12	23.1 0.3	53.10 .41	77.4 1.7	14.31 .13	34.2 0.3
Mar. 10.1	53.58 .10	7.9 0.9	5.69 .10	22.8 0.2	52.72 .34	75.5 2.0	14.19 .11	34.0 0.2
20.1	53.49 .07	7.0 0.8	5.60 .07	22.6 −0.1	52.41 .26	73.3 2.3	14.09 .08	33.8 −0.1
30.1	53.44 −.03	6.2 0.7	5.55 −.03	22.6 +0.1	52.19 .17	70.9 2.5	14.03 −.05	33.9 +0.1
Apr. 9.1	53.43 +.02	5.6 −0.5	5.54 +.01	22.8 +0.3	52.08 −.07	68.4 −2.5	14.00 .00	34.1 +0.3
19.0	53.47 .07	5.1 0.3	5.57 .05	23.2 0.5	52.06 +.04	65.8 2.5	14.02 +.04	34.5 0.5
29.0	53.56 .11	4.9 −0.1	5.65 .10	23.9 0.8	52.16 .15	63.4 2.4	14.08 .08	35.1 0.7
May 9.0	53.70 .16	4.9 +0.1	5.77 .14	24.7 1.0	52.37 .26	61.1 2.1	14.19 .13	36.0 1.0
18.9	53.88 .20	5.2 0.4	5.94 .19	25.8 1.2	52.68 .36	59.1 1.8	14.34 .17	37.1 1.2
28.9	54.11 +.24	5.7 +0.7	6.15 +.22	27.1 +1.4	53.08 +.44	57.4 −1.5	14.54 +.21	38.3 +1.4
June 7.9	54.37 .28	6.6 1.0	6.39 .25	28.6 1.6	53.56 .52	56.1 1.1	14.77 .25	39.8 1.5
17.9	54.67 .30	7.7 1.2	6.66 .28	30.2 1.7	54.11 .57	55.3 0.6	15.03 .27	41.4 1.7
27.8	54.98 .32	9.0 1.4	6.95 .30	32.0 1.8	54.71 .62	54.9 −0.2	15.31 .29	43.1 1.7
July 7.8	55.31 .33	10.5 1.6	7.25 .31	33.8 1.8	55.35 .65	55.0 +0.3	15.61 .30	44.9 1.8
17.8	55.64 +.33	12.1 +1.7	7.56 +.31	35.6 +1.8	56.00 +.66	55.5 +0.8	15.92 +.31	46.7 +1.8
27.7	55.96 .32	13.9 1.8	7.87 .30	37.4 1.8	56.66 .65	56.5 1.2	16.23 .31	48.5 1.7
Aug. 6.7	56.28 .31	15.7 1.8	8.18 .29	39.2 1.7	57.31 .64	57.9 1.6	16.53 .30	50.2 1.6
16.7	56.58 .29	17.6 1.8	8.46 .27	40.8 1.5	57.93 .61	59.7 2.0	16.82 .28	51.7 1.5
26.7	56.86 .26	19.4 1.8	8.73 .25	42.2 1.3	58.52 .57	61.9 2.3	17.10 .26	53.1 1.3
Sept. 5.6	57.11 +.24	21.2 +1.7	8.97 +.23	43.4 +1.1	59.07 +.52	64.3 +2.6	17.35 +.24	54.3 +1.1
15.6	57.33 .21	22.8 1.6	9.18 .20	44.5 0.9	59.55 .46	67.1 2.8	17.57 .21	55.3 0.9
25.6	57.52 .18	24.4 1.5	9.37 .17	45.3 0.7	59.98 .39	70.0 3.0	17.77 .18	56.1 0.7
Oct. 5.6	57.68 .14	25.8 1.3	9.52 .14	45.9 0.5	60.34 .32	73.1 3.1	17.94 .15	56.7 0.5
15.5	57.81 .11	27.1 1.2	9.65 .11	46.3 0.3	60.63 .25	76.3 3.2	18.08 .13	57.0 +0.2
25.5	57.91 +.08	28.2 +1.0	9.74 +.08	46.5 +0.1	60.84 +.17	79.6 +3.2	18.19 +.10	57.1 0.0
Nov. 4.5	57.97 .05	29.1 0.8	9.81 .05	46.5 −0.1	60.97 +.09	82.7 3.1	18.27 .07	57.1 −0.1
14.4	58.00 +.02	29.8 0.7	9.85 +.02	46.4 0.2	61.01 .00	85.8 3.0	18.33 .04	56.9 0.2
24.4	58.00 −.01	30.4 0.5	9.85 −.01	46.1 0.3	60.97 −.08	88.7 2.8	18.35 +.01	56.6 0.3
Dec. 4.4	57.98 .04	30.8 0.3	9.83 .03	45.7 0.4	60.85 .16	91.3 2.5	18.34 −.02	56.2 0.4
14.4	57.92 −.07	31.0 +0.1	9.79 −.06	45.3 −0.5	60.64 −.25	93.7 +0.1	18.31 −.05	55.8 −0.5
24.3	57.84 .09	31.0 −0.1	9.72 .08	44.8 0.5	60.36 .32	95.6 1.7	18.24 .07	55.3 0.5
34.3	57.74 −.11	30.9 −0.3	9.62 −.10	44.3 −0.5	60.01 −.36	97.0 +1.2	18.16 −.10	54.7 −0.5

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Ceti.		α Ceti.		48 Cephei (H.)		ζ Arietis.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m 2 37	+ 2° 45′	h m 2 56	+ 3° 39′	h m 3 6	+77° 19′	h m 3 8	+20° 37′
	s	″	s	″	s	″	s	″
(Dec. 30.3)	32.65 −.09	55.4 −0.7	28.42 −.07	6.0 −0.7	17.55 −.58	40.6 +2.2	31.16 −.08	54.3 −0.1
Jan. 9.3	32.55 .11	54.7 0.7	28.33 .10	5.3 0.6	16.89 .71	42.5 1.7	31.07 .10	54.2 0.2
19.2	32.43 .13	54.0 0.6	28.22 .13	4.7 0.6	16.12 .82	43.9 1.1	30.95 .13	54.0 0.3
29.2	32.29 .14	53.5 0.5	28.08 .14	4.2 0.5	15.26 .88	44.8 +0.6	30.81 .15	53.6 0.3
Feb. 8.2	32.14 .15	53.1 0.4	27.93 .15	3.7 0.4	14.35 .91	45.1 0.0	30.65 .16	53.3 0.4
18.2	31.99 −.15	52.7 −0.3	27.78 −.15	3.4 −0.3	13.43 −.91	44.7 −0.6	30.48 −.17	52.8 −0.5
28.2	31.85 .14	52.5 −0.1	27.63 .15	3.2 −0.2	12.54 .86	43.9 1.2	30.31 .16	52.3 0.5
Mar. 10.1	31.72 .12	52.5 0.0	27.49 .13	3.1 0.0	11.71 .77	42.4 1.7	30.16 .15	51.7 0.6
20.1	31.61 .09	52.6 +0.2	27.37 .11	3.2 +0.2	10.99 .65	40.6 2.1	30.02 .12	51.1 0.5
30.1	31.54 .06	52.9 0.4	27.28 .08	3.4 0.3	10.40 .51	38.3 2.4	29.91 .09	50.6 0.5
Apr. 9.1	31.50 −.02	53.4 +0.6	27.22 −.04	3.8 +0.5	9.97 −.34	35.8 −2.6	29.84 −.05	50.2 −0.4
19.0	31.50 +.02	54.1 0.8	27.20 +.01	4.5 0.7	9.73 −.15	33.1 2.7	29.82 .00	49.9 0.2
29.0	31.54 .07	55.0 1.0	27.23 .05	5.3 0.9	9.67 +.03	30.3 2.7	29.84 +.04	49.7 −0.1
May 9.0	31.63 .11	56.1 1.2	27.30 .10	6.3 1.1	9.80 .22	27.6 2.6	29.91 .09	49.7 +0.1
19.0	31.77 .16	57.4 1.4	27.42 .14	7.6 1.3	10.12 .41	25.0 2.5	30.03 .14	49.9 0.3
28.9	31.94 +.20	59.0 +1.6	27.58 +.18	9.0 +1.5	10.61 +.58	22.7 −2.2	30.19 +.19	50.4 +0.5
June 7.9	32.16 .23	60.6 1.7	27.78 .22	10.6 1.6	11.27 .72	20.6 1.9	30.40 .23	51.0 0.7
17.9	32.41 .26	62.4 1.8	28.02 .25	12.3 1.7	12.06 .85	18.9 1.5	30.64 .26	51.8 0.9
27.8	32.68 .28	64.3 1.9	28.28 .27	14.1 1.8	12.98 .96	17.7 1.0	30.92 .29	52.9 1.1
July 7.8	32.97 .30	66.1 1.9	28.57 .29	15.9 1.8	13.98 1.04	16.8 0.6	31.21 .31	54.1 1.2
17.8	33.27 +.30	68.0 +1.8	28.86 +.30	17.7 +1.8	15.06+1.10	16.5 −0.1	31.53 +.32	55.4 +1.3
27.7	33.58 .30	69.7 1.7	29.17 .30	19.4 1.7	16.18 1.13	16.6 +0.3	31.85 .32	56.8 1.4
Aug. 6.7	33.88 .30	71.4 1.5	29.47 .30	21.0 1.5	17.31 1.13	17.2 0.8	32.17 .32	58.2 1.5
16.7	34.17 .28	72.8 1.3	29.76 .29	22.4 1.3	18.44 1.11	18.2 1.3	32.48 .31	59.7 1.4
26.7	34.45 .27	74.1 1.1	30.05 .27	23.7 1.1	19.54 1.08	19.7 1.7	32.79 .30	61.1 1.4
Sept. 5.6	34.70 +.24	75.1 +0.9	30.31 +.26	24.7 +0.9	20.60+1.02	21.6 +2.1	33.08 +.28	62.5 +1.3
15.6	34.94 .22	75.8 0.6	30.56 .24	25.5 0.6	21.58 .94	23.9 2.4	33.35 .26	63.8 1.2
25.6	35.15 .20	76.4 0.4	30.78 .21	26.0 0.4	22.48 .85	26.5 2.7	33.59 .23	64.9 1.1
Oct. 5.6	35.33 .17	76.6 +0.1	30.98 .18	26.3 +0.1	23.29 .74	29.4 3.0	33.82 .21	66.0 1.0
15.5	35.48 .14	76.6 −0.1	31.15 .16	26.3 −0.1	23.97 .62	32.5 3.2	34.01 .18	66.9 0.8
25.5	35.60 +.11	76.4 −0.3	31.29 +.13	26.1 −0.3	24.52 +.48	35.8 +3.3	34.18 +.15	67.6 +0.7
Nov. 4.5	35.70 .08	76.0 0.5	31.41 .10	25.8 0.4	24.92 .33	39.2 3.4	34.32 .12	68.3 0.6
14.4	35.76 .05	75.5 0.6	31.49 .07	25.2 0.6	25.18 +.17	42.6 3.4	34.42 .09	68.8 0.5
24.4	35.80 +.02	74.9 0.7	31.54 .04	24.6 0.6	25.26 .00	45.9 3.3	34.50 .06	69.2 0.3
Dec. 4.4	35.80 −.01	74.2 0.7	31.56 +.01	24.0 0.7	25.18 −.17	49.1 3.1	34.53 +.02	69.5 0.2
14.4	35.77 −.04	73.5 −0.7	31.56 −.02	23.3 −0.7	24.93 −.33	52.1 +2.8	34.54 −.01	69.7 +0.1
24.3	35.72 .07	72.7 0.7	31.52 .05	22.5 0.7	24.52 .49	54.8 2.5	34.51 .05	69.8 0.0
34.3	35.64 −.09	72.0 −0.7	31.45 −.08	21.9 −0.6	23.95 −.66	57.0 +2.0	34.44 −.08	69.7 −0.1

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Persei.		ε Eridani.		δ Persei.		η Tauri.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m 3 16	° ′ +49 27	h m 3 27	° ′ - 9 49	h m 3 34	° ′ +47 25	h m 3 40	° ′ +23 45
	s	″	s	″	s	″	s	″
(Dec. 30.4)	24.22 -.13	59.1 +1.2	42.04 -.07	74.3 -1.2	61.65 -.10	57.2 +1.2	53.18 -.05	37.9 +0.2
Jan. 9.3	24.07 .17	60.2 0.9	41.96 .10	75.4 1.0	61.53 .15	58.3 0.9	53.11 .09	38.0 +0.1
19.3	23.87 .21	60.9 0.5	41.84 .13	76.3 0.8	61.36 .19	59.1 0.6	53.00 .12	38.0 -0.1
29.3	23.64 .24	61.3 +0.1	41.70 .15	77.1 0.6	61.15 .22	59.6 +0.3	52.87 .15	37.9 0.2
Feb. 8.2	23.39 .26	61.2 -0.2	41.55 .16	77.5 0.4	60.91 .25	59.7 -0.1	52.71 .17	37.7 0.3
18.2	23.12 -.27	60.8 -0.6	41.38 -.17	77.8 -0.1	60.66 -.26	59.5 -0.4	52.53 -.18	37.4 -0.4
28.2	22.85 .26	60.0 0.9	41.21 .17	77.8 +0.1	60.40 .25	58.9 0.7	52.35 .18	37.0 0.4
Mar. 10.2	22.60 .24	58.9 1.2	41.05 .16	77.5 0.4	60.15 .24	58.0 1.0	52.17 .17	36.5 0.5
20.1	22.38 .20	57.6 1.5	40.90 .14	77.0 0.7	59.93 .21	56.9 1.3	52.01 .15	36.0 0.5
30.1	22.21 .15	56.0 1.6	40.78 .11	76.2 0.9	59.74 .16	55.5 1.4	51.88 .12	35.4 0.5
Apr. 9.1	22.08 -.09	54.3 -1.8	40.69 -.07	75.1 +1.2	59.60 -.11	54.0 -1.5	51.78 -.08	34.9 -0.5
19.1	22.02 -.03	52.6 1.8	40.63 -.03	73.8 1.4	59.52 -.05	52.4 1.6	51.72 -.03	34.5 0.4
29.0	22.02 +.04	50.9 1.7	40.62 +.01	72.3 1.6	59.51 +.01	50.8 1.5	51.71 +.01	34.1 0.3
May 9.0	22.10 .11	49.3 1.5	40.65 .06	70.5 1.8	59.55 .08	49.3 1.4	51.75 .06	33.9 -0.1
19.0	22.24 .17	47.8 1.3	40.73 .10	68.6 2.0	59.67 .15	48.0 1.3	51.84 .11	33.9 +0.1
28.9	22.45 +.24	46.6 -1.1	40.86 +.15	66.5 +2.1	59.85 +.21	46.8 -1.1	51.98 +.16	34.0 +0.2
June 7.9	22.71 .29	45.7 0.8	41.03 .18	64.3 2.2	60.08 .26	45.8 0.8	52.16 .20	34.4 0.4
17.9	23.03 .34	45.0 0.5	41.23 .22	62.1 2.2	60.37 .31	45.2 0.5	52.39 .24	34.9 0.6
27.9	23.39 .38	44.7 -0.2	41.46 .25	59.9 2.2	60.71 .36	44.8 -0.2	52.64 .27	35.6 0.8
July 7.8	23.78 .41	44.7 +0.2	41.72 .27	57.7 2.1	61.08 .38	44.7 +0.1	52.93 .30	36.5 0.9
17.8	24.20 +.42	45.1 +0.5	42.00 +.29	55.6 +2.0	61.47 +.40	44.9 +0.4	53.23 +.31	37.5 +1.1
27.8	24.63 .43	45.7 0.8	42.30 .30	53.8 1.8	61.88 .42	45.4 0.6	53.55 .32	38.6 1.2
Aug. 6.8	25.07 .43	46.7 1.1	42.59 .29	52.1 1.5	62.30 .43	46.2 0.9	53.88 .32	39.8 1.2
16.7	25.50 .43	47.9 1.4	42.88 .29	50.7 1.2	62.72 .42	47.2 1.2	54.20 .32	41.0 1.2
26.7	25.92 .41	49.4 1.6	43.18 .28	49.7 0.9	63.14 .41	48.5 1.4	54.52 .31	42.3 1.2
Sept. 5.7	26.32 +.39	51.1 +1.8	43.45 +.27	49.0 +0.5	63.54 +.39	49.9 +1.6	54.83 +.30	43.5 +1.2
15.6	26.70 .36	53.0 1.9	43.71 .25	48.6 +0.2	63.92 .37	51.6 1.7	55.12 .26	44.7 1.1
25.6	27.05 .33	55.0 2.1	43.96 .23	48.6 -0.2	64.27 .34	53.4 1.8	55.40 .26	45.7 1.0
Oct. 5.6	27.36 .30	57.1 2.2	44.17 .20	49.0 0.5	64.60 .31	55.3 1.9	55.65 .24	46.7 0.9
15.6	27.64 .26	59.3 2.2	44.36 .18	49.7 0.8	64.89 .27	57.2 2.0	55.88 .22	47.6 0.9
25.5	27.88 +.22	61.6 +2.2	44.53 +.15	50.6 -1.1	65.15 +.24	59.3 +2.0	56.09 +.19	48.5 +0.8
Nov. 4.5	28.07 .17	63.8 2.2	44.66 .12	51.8 1.3	65.37 .20	61.3 2.0	56.26 .16	49.2 0.7
14.5	28.22 .12	66.0 2.2	44.77 .09	53.2 1.4	65.54 .15	63.3 2.0	56.41 .13	49.8 0.6
24.5	28.32 .07	68.1 2.0	44.84 .06	54.6 1.5	65.67 .10	65.3 1.9	56.52 .09	50.3 0.5
Dec. 4.4	28.36 +.02	70.1 1.9	44.88 +.02	56.1 1.5	65.74 +.05	67.2 1.8	56.59 .06	50.8 0.4
14.4	28.35 -.04	71.9 +1.7	44.89 -.01	57.6 -1.4	65.76 -.01	68.9 +1.6	56.63 +.02	51.1 +0.3
24.4	28.29 .09	73.4 1.4	44.86 .04	58.9 1.3	65.73 .06	70.4 1.4	56.63 -.02	51.4 0.2
34.4	28.18 -.14	74.7 +1.1	44.80 -.08	60.2 -1.1	65.64 -.11	71.7 +1.1	56.59 -.06	51.6 +0.1

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Persei.		γ Eridani.		γ Tauri.		ε Tauri.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m 3 47	° ′ +31 33	h m 3 52	° ′ −13 49	h m 4 13	° ′ +15 21	h m 4 22	° ′ +18 55
	s	″	s	″	s	″	s	″
(Dec. 30.4)	9.39 −.05	10.6 +0.5	51.22 −.05	40.6 −1.5	28.71 −.02	27.6 −0.2	8.23 −.01	56.7 −0.1
Jan. 9.3	9.31 .09	11.1 0.4	51.15 .09	41.9 1.3	28.67 .06	27.4 0.2	8.20 .05	56.7 0.1
19.3	9.20 .13	11.4 +0.2	51.04 .12	43.1 1.0	28.59 .10	27.2 0.2	8.12 .09	56.6 0.1
29.3	9.05 .16	11.5 0.0	50.91 .15	44.0 0.8	28.48 .13	26.9 0.2	8.01 .13	56.5 0.1
Feb. 8.3	8.88 .18	11.5 −0.1	50.75 .16	44.6 0.5	28.34 .15	26.7 0.2	7.87 .15	56.3 0.2
18.2	8.69 −.19	11.3 −0.3	50.58 −.18	44.9 −0.1	28.17 −.17	26.4 −0.2	7.70 −.16	56.2 −0.2
28.2	8.49 .19	10.8 0.5	50.40 .18	44.9 +0.1	28.00 .17	26.2 0.2	7.53 .16	56.0 0.2
Mar. 10.2	8.30 .18	10.3 0.6	50.23 .17	44.7 0.4	27.83 .17	26.0 0.2	7.35 .16	55.7 0.2
20.2	8.12 .16	9.6 0.7	50.06 .15	44.1 0.7	27.66 .16	25.8 0.2	7.18 .16	55.5 0.2
30.1	7.97 .13	8.8 0.8	49.92 .13	43.2 1.0	27.51 .13	25.6 −0.1	7.02 .14	55.2 0.2
Apr. 9.1	7.86 −.09	8.0 −0.8	49.81 −.10	42.1 +1.3	27.40 −.10	25.5 0.0	6.90 −.11	55.0 −0.2
19.1	7.79 −.04	7.1 0.8	49.73 .06	40.7 1.5	27.31 .06	25.6 +0.1	6.81 .07	54.9 −0.1
29.0	7.77 +.01	6.4 0.7	49.69 −.01	39.0 1.8	27.27 −.02	25.7 0.2	6.76 −.02	54.8 0.0
May 9.0	7.80 .06	5.7 0.6	49.70 +.03	37.2 2.0	27.28 +.03	25.9 0.3	6.76 +.02	54.9 +0.1
19.0	7.89 .11	5.2 0.4	49.76 .08	35.1 2.1	27.33 .08	26.3 0.5	6.81 .07	55.1 0.3
29.0	8.03 +.16	4.9 −0.2	49.86 +.12	32.9 +2.3	27.44 +.12	26.9 +0.6	6.90 +.12	55.4 +0.4
June 7.9	8.22 .21	4.7 0.0	50.00 .16	30.6 2.3	27.58 .17	27.6 0.8	7.04 .16	55.8 0.5
17.9	8.45 .25	4.8 +0.2	50.18 .20	28.2 2.4	27.77 .20	28.4 0.9	7.22 .20	56.4 0.7
27.9	8.72 .28	5.1 0.4	50.40 .23	25.8 2.3	27.99 .23	29.4 1.0	7.44 .23	57.2 0.8
July 7.9	9.02 .31	5.6 0.6	50.65 .26	23.5 2.2	28.24 .26	30.5 1.1	7.69 .26	58.0 0.9
17.8	9.34 +.33	6.3 +0.8	50.91 +.28	21.3 +2.1	28.51 +.28	31.6 +1.2	7.97 +.28	59.0 +1.0
27.8	9.68 .34	7.1 0.9	51.20 .29	19.4 1.9	28.80 .30	32.8 1.2	8.26 .30	60.0 1.0
Aug. 6.8	10.02 .34	8.1 1.0	51.49 .30	17.6 1.6	29.10 .31	34.0 1.2	8.57 .31	61.1 1.0
16.7	10.37 .34	9.2 1.1	51.79 .30	16.2 1.2	29.41 .31	35.1 1.1	8.88 .31	62.1 1.0
26.7	10.71 .34	10.4 1.2	52.09 .29	15.2 0.9	29.72 .30	36.2 1.0	9.19 .31	63.1 1.0
Sept. 5.7	11.04 +.32	11.6 +1.3	52.37 +.28	14.5 +0.5	30.02 +.30	37.1 +0.9	9.50 +.30	64.0 +0.9
15.7	11.36 .31	12.9 1.3	52.65 .27	14.2 +0.1	30.31 .29	37.9 0.7	9.80 .29	64.8 0.8
25.6	11.66 .29	14.2 1.3	52.91 .25	14.3 −0.3	30.59 .27	38.6 0.6	10.09 .28	65.5 0.7
Oct. 5.6	11.93 .26	15.4 1.2	53.14 .23	14.8 0.7	30.86 .25	39.1 0.4	10.36 .26	66.1 0.5
15.6	12.18 .24	16.6 1.2	53.36 .20	15.7 1.0	31.10 .23	39.5 0.3	10.62 .25	66.6 0.4
25.6	12.41 +.21	17.8 +1.2	53.55 +.18	16.9 −1.3	31.32 +.21	39.7 +0.2	10.85 +.22	66.9 +0.3
Nov. 4.5	12.60 .18	19.0 1.1	53.71 .15	18.3 1.5	31.52 .18	39.8 +0.1	11.06 .20	67.2 0.2
14.5	12.76 .14	20.0 1.0	53.84 .11	19.9 1.7	31.69 .15	39.8 0.0	11.24 .17	67.4 0.1
24.5	12.89 .10	21.0 1.0	53.94 .08	21.6 1.7	31.83 .12	39.7 −0.1	11.40 .13	67.5 +0.1
Dec. 4.4	12.97 .06	22.0 0.9	54.00 .04	23.4 1.8	31.93 .09	39.6 0.2	11.51 .10	67.6 0.0
14.4	13.02 +.02	22.8 +0.8	54.02 +.01	25.2 −1.7	32.00 +.05	39.4 −0.2	11.59 +.06	67.6 0.0
24.4	13.02 −.03	23.5 0.7	54.01 −.03	26.8 1.6	32.03 +.01	39.2 0.2	11.62 +.02	67.6 0.0
34.4	12.96 −.06	24.1 +0.5	53.97 −.07	28.3 −1.3	32.01 −.03	39.0 −0.2	11.62 −.02	67.6 0.0

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Tauri. (*Aldebaran.*)		α Camelopardalis.		ι Aurigæ.		11 Orionis.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m 4 29	° ′ +16 17	h m 4 42	° ′ +66 8	h m 4 49	° ′ +32 59	h m 4 58	° ′ +15 14
	s	″	s	″	s	″	s	″
(Dec. 30.4)	33.24 -.01	3.1 -0.2	62.19 -.07	72.6 +2.4	46.19 +.01	20.4 +0.8	13.78 +.02	50.8 -0.3
Jan. 9.4	33.21 .05	3.0 0.2	62.07 .17	74.9 2.2	46.18 -.04	21.1 0.7	13.78 -.03	50.6 0.2
19.4	33.14 .09	2.8 0.2	61.85 .27	77.0 1.9	46.11 .09	21.8 0.6	13.73 .07	50.4 0.2
29.3	33.03 .12	2.6 0.2	61.54 .36	78.6 1.5	46.00 .13	22.3 0.4	13.64 .11	50.2 0.2
Feb. 8.3	32.90 .15	2.4 0.2	61.16 .41	79.9 1.0	45.85 .16	22.6 +0.3	13.52 .14	50.0 0.1
18.3	32.74 -.17	2.2 -0.2	60.72 -.45	80.7 +0.6	45.67 -.19	22.8 0.0	13.37 -.16	49.9 -0.1
28.2	32.56 .18	2.0 0.2	60.25 .47	81.0 +0.1	45.47 .21	22.8 -0.1	13.19 .18	49.8 0.1
Mar. 10.2	32.38 .18	1.8 0.2	59.77 .47	80.8 -0.4	45.26 .21	22.7 0.2	13.01 .18	49.7 0.1
20.2	32.21 .16	1.6 0.2	59.31 .44	80.1 0.9	45.06 .20	22.4 0.4	12.83 .17	49.6 -0.1
30.2	32.05 .14	1.5 0.1	58.89 .40	79.0 1.3	44.87 .17	21.9 0.5	12.67 .15	49.5 0.0
Apr. 9.1	31.92 -.11	1.4 -0.1	58.52 -.33	77.6 -1.6	44.71 -.14	21.3 -0.6	12.52 -.13	49.5 0.0
19.1	31.83 .07	1.4 0.0	58.23 .25	75.8 1.9	44.58 .10	20.6 0.7	12.41 .09	49.6 +0.1
29.1	31.78 -.03	1.4 +0.1	58.03 .15	73.7 2.1	44.50 -.05	20.0 0.7	12.34 .05	49.7 0.2
May 9.1	31.77 +.02	1.6 0.3	57.93 -.05	71.5 2.2	44.47 .00	19.3 0.7	12.30 -.01	50.0 0.3
19.0	31.81 .06	2.0 0.4	57.93 +.05	69.3 2.2	44.50 +.04	18.6 0.6	12.32 +.04	50.3 0.4
29.0	31.89 +.11	2.4 +0.5	58.03 +.16	67.0 -2.2	44.56 +.10	18.1 -0.5	12.37 +.08	50.8 +0.5
June 8.0	32.02 .15	3.0 0.7	58.24 .25	64.9 2.1	44.70 .16	17.6 0.4	12.48 .12	51.4 0.6
17.9	32.20 .19	3.7 0.8	58.54 .35	62.9 1.9	44.87 .20	17.3 0.2	12.62 .16	52.0 0.7
27.9	32.41 .22	4.6 0.9	58.93 .43	61.1 1.7	45.09 .24	17.2 -0.1	12.80 .20	52.8 0.8
July 7.9	32.65 .25	5.5 1.0	59.40 .50	59.6 1.4	45.35 .27	17.2 +0.1	13.02 .23	53.7 0.9
17.9	32.91 +.28	6.5 +1.0	59.93 +.56	58.4 -1.0	45.63 +.30	17.3 +0.2	13.27 +.26	54.7 +0.9
27.8	33.20 .29	7.6 1.1	60.51 .60	57.5 0.7	45.94 .32	17.6 0.3	13.54 .28	55.6 0.9
Aug. 6.8	33.50 .30	8.7 1.0	61.13 .64	57.0 -0.4	46.27 .33	18.0 0.5	13.82 .29	56.6 0.9
16.8	33.80 .31	9.7 1.0	61.78 .66	56.7 0.0	46.61 .34	18.5 0.6	14.12 .30	57.5 0.9
26.8	34.11 .31	10.7 0.9	62.45 .67	56.9 +0.4	46.96 .35	19.1 0.6	14.42 .31	58.3 0.8
Sept. 5.7	34.41 +.30	11.5 +0.8	63.12 +.67	57.4 +0.7	47.31 +.34	19.8 +0.7	14.72 +.30	59.0 +0.7
15.7	34.71 .29	12.3 0.7	63.79 .65	58.3 1.0	47.65 .34	20.5 0.7	15.02 .30	59.6 0.5
25.7	35.00 .28	12.9 0.5	64.44 .64	59.5 1.4	47.99 .33	21.3 0.8	15.32 .29	60.0 0.4
Oct. 5.6	35.27 .26	13.4 0.4	65.06 .61	61.1 1.7	48.31 .32	22.1 0.8	15.60 .28	60.3 0.2
15.6	35.53 .25	13.7 0.3	65.65 .57	62.9 1.9	48.62 .30	22.9 0.8	15.88 .26	60.5 +0.1
25.6	35.77 +.23	13.9 +0.1	66.19 +.51	64.9 +2.2	48.90 +.28	23.7 +0.8	16.13 +.25	60.5 -0.1
Nov. 4.6	35.98 .20	14.0 0.0	66.67 .45	67.2 2.4	49.17 .25	24.5 0.8	16.37 .22	60.4 0.1
14.5	36.17 .17	13.9 -0.1	67.08 .37	69.7 2.6	49.40 .22	25.3 0.8	16.58 .20	60.2 0.2
24.5	36.32 .14	13.9 0.1	67.42 .29	72.3 2.7	49.60 .18	26.2 0.9	16.77 .17	60.0 0.3
Dec. 4.5	36.44 .10	13.8 0.1	67.66 .20	75.0 2.7	49.77 .14	27.0 0.9	16.92 .13	59.7 0.3
14.5	36.53 +.06	13.6 -0.2	67.81 +.10	77.7 +2.7	49.88 +.09	27.9 +0.8	17.03 +.09	59.4 -0.3
24.4	36.57 +.02	13.4 0.2	67.86 .00	80.4 2.5	49.95 +.04	28.7 0.8	17.10 +.05	59.1 0.3
34.4	36.57 -.02	13.3 -0.2	67.80 -.10	82.8 +2.4	49.97 .00	29.5 +0.7	17.12 .00	58.9 -0.2

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Aurigæ. (*Capella.*)		β Orionis. (*Rigel.*)		β Tauri.		Groombridge 966.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m 5 8	+45° 52′	h m 5 9	− 8° 19′	h m 5 19	+28° 30′	h m 5 24	+74° 57′
	s	″	s	″	s	″	s	″
(Dec. 30.4)	29.86 +.03	62.0 +1.5	12.56 +.01	57.6 −1.6	16.81 +.04	43.1 +0.5	56.20 −.01	67.5 +2.9
Jan. 9.4	29.85 −.04	63.4 1.4	12.55 −.03	59.1 1.4	16.82 −.01	43.6 0.5	56.10 .18	70.4 2.7
19.4	29.78 .10	64.7 1.2	12.50 .07	60.4 1.2	16.79 .06	44.1 0.4	55.84 .33	73.0 2.5
29.4	29.65 .15	65.8 1.0	12.41 .11	61.5 1.0	16.71 .10	44.5 0.4	55.43 .47	75.3 2.1
Feb. 8.3	29.48 .19	66.7 0.8	12.28 .14	62.3 0.7	16.58 .14	44.9 0.3	54.89 .60	77.2 1.7
18.3	29.26 −.23	67.3 +0.5	12.13 −.16	62.9 −0.5	16.43 −.17	45.1 +0.2	54.25 −.68	78.7 +1.2
28.3	29.02 .25	67.7 +0.2	11.95 .18	63.3 −0.2	16.24 .19	45.3 +0.1	53.52 .74	79.7 0.6
Mar. 10.2	28.76 .26	67.7 −0.1	11.77 .18	63.4 0.0	16.04 .20	45.3 0.0	52.76 .76	80.1 +0.1
20.2	28.50 .25	67.4 0.4	11.59 .18	63.2 +0.3	15.84 .19	45.2 −0.2	52.00 .75	79.9 −0.4
30.2	28.26 .23	66.8 0.7	11.41 .16	62.8 0.5	15.66 .18	45.0 0.3	51.26 .70	79.3 0.9
Apr. 9.2	28.05 −.19	66.0 −0.9	11.26 −.14	62.2 +0.8	15.49 −.15	44.7 −0.3	50.59 −.62	78.1 −1.4
19.1	27.88 .15	65.0 1.1	11.13 .11	61.3 1.0	15.35 .12	44.3 0.4	50.01 .52	76.5 1.8
29.1	27.76 .09	63.8 1.2	11.04 .07	60.1 1.2	15.25 .08	43.9 0.4	49.55 .39	74.6 2.1
May 9.1	27.69 −.03	62.5 1.3	10.99 −.03	58.8 1.5	15.20 −.03	43.5 0.4	49.23 .25	72.3 2.3
19.1	27.69 +.03	61.2 1.3	10.97 +.01	57.2 1.6	15.19 +.02	43.1 0.4	49.05 −.10	69.9 2.5
29.0	27.74 +.09	60.0 −1.3	11.01 +.05	55.5 +1.8	15.23 +.07	42.8 −0.3	49.03 +.06	67.3 −2.6
June 8.0	27.86 .15	58.7 1.2	11.08 .09	53.6 1.9	15.33 .12	42.5 0.2	49.16 .21	64.7 2.5
18.0	28.04 .20	57.6 1.0	11.20 .14	51.6 2.0	15.47 .16	42.4 −0.1	49.45 .36	62.2 2.4
27.9	28.27 .25	56.6 0.9	11.35 .17	49.6 2.0	15.65 .20	42.3 0.0	49.88 .49	59.8 2.2
July 7.9	28.55 .30	55.8 0.7	11.54 .20	47.6 2.0	15.87 .24	42.4 +0.1	50.43 .62	57.6 2.1
17.9	28.86 +.33	55.2 −0.5	11.76 +.23	45.7 +1.9	16.12 +.26	42.5 +0.2	51.11 +.73	55.7 −1.8
27.9	29.21 .36	54.8 0.3	12.00 .25	43.8 1.8	16.40 .29	42.8 0.3	51.89 .82	54.0 1.5
Aug. 6.8	29.59 .38	54.6 −0.1	12.26 .27	42.1 1.6	16.70 .31	43.1 0.4	52.76 .90	52.7 1.2
16.8	29.98 .40	54.5 +0.1	12.54 .28	40.7 1.3	17.01 .32	43.5 0.4	53.69 .96	51.7 0.8
26.8	30.39 .41	54.7 0.3	12.82 .28	39.6 1.0	17.34 .33	43.9 0.4	54.67 1.00	51.1 −0.4
Sept. 5.8	30.80 +.41	55.0 +0.4	13.11 +.29	38.7 +0.6	17.67 +.33	44.3 +0.4	55.69 +1.02	50.9 0.0
15.7	31.21 .41	55.6 0.6	13.39 .28	38.3 +0.3	18.00 .33	44.8 0.4	56.72 1.03	51.1 +0.4
25.7	31.62 .40	56.2 0.8	13.68 .28	38.2 −0.1	18.33 .33	45.2 0.4	57.75 1.02	51.7 0.8
Oct. 5.7	32.01 .39	57.1 0.9	13.95 .27	38.4 0.4	18.66 .32	45.6 0.4	58.76 .99	52.7 1.2
15.6	32.38 .37	58.1 1.1	14.21 .25	39.0 0.8	18.97 .30	46.0 0.4	59.74 .94	54.1 1.6
25.6	32.75 +.34	59.2 +1.2	14.46 +.24	40.0 −1.1	19.27 +.29	46.5 +0.4	60.65 +.88	55.8 +1.9
Nov. 4.6	33.08 .31	60.4 1.3	14.69 .21	41.2 1.3	19.54 .27	46.9 0.4	61.49 .79	57.9 2.2
14.6	33.38 .28	61.8 1.4	14.89 .19	42.7 1.5	19.80 .24	47.3 0.4	62.23 .68	60.3 2.5
24.5	33.64 .23	63.3 1.5	15.06 .16	44.3 1.6	20.02 .21	47.7 0.4	62.86 .56	62.9 2.7
Dec. 4.5	33.85 .18	64.8 1.5	15.20 .12	45.9 1.7	20.21 .17	48.1 0.5	63.35 .42	65.8 2.9
14.5	34.01 +.13	66.3 +1.6	15.31 +.08	47.7 −1.7	20.36 +.12	48.6 +0.5	63.69 +.26	68.7 +3.0
24.5	34.11 +.07	67.9 1.5	15.37 +.04	49.3 1.6	20.46 .08	49.1 0.5	63.88 +.10	71.7 3.0
34.4	34.14 .00	69.4 +1.5	15.39 .02	50.9 −1.5	20.51 +.03	49.6 +0.5	63.89 −.02	74.7 +2.9

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Orionis.		α Leporis.		ε Orionis.		α Columbæ.	
	Right Ascension.	Declination *South.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *South.*
	h m 5 26	° ′ − 0 22	h m 5 27	° ′ −17 53	h m 5 30	° ′ − 1 16	h m 5 35	° ′ −34 7
	s	″	s	″	s	″	s	″
(Dec.30.4)	20.48 +.04	61.5 −1.2	50.60 +.02	76.3 −2.1	35.20 +.04	30.8 −1.3	38.72 .00	70.4 −2.8
Jan. 9.4	20.50 −.01	62.6 1.1	50.59 −.03	78.3 1.9	35.22 −.01	32.0 1.2	38.70 −.05	73.1 2.5
19.4	20.47 .05	63.6 0.9	50.54 .07	80.1 1.6	35.19 .05	33.0 1.0	38.62 .10	76.5 2.2
29.4	20.39 .09	64.5 0.7	50.45 .11	81.6 1.3	35.12 .09	33.9 0.8	38.50 .15	77.5 1.8
Feb. 8.3	20.28 .13	65.1 0.6	50.32 .14	82.8 1.0	35.01 .12	34.6 0.6	38.33 .18	79.1 1.4
18.3	20.14 −.15	65.6 −0.4	50.16 −.17	83.7 −0.7	34.87 −.15	35.1 −0.4	38.13 −.21	80.4 −1.0
28.3	19.98 .17	65.9 −0.2	49.98 .19	84.2 −0.4	34.71 .17	35.5 −0.2	37.90 .23	81.1 0.5
Mar. 10.3	19.80 .18	66.0 0.0	49.78 .20	84.5 0.0	34.53 .18	35.6 0.0	37.66 .24	81.5 −0.1
20.2	19.62 .18	66.0 +0.1	49.58 .20	84.3 +0.3	34.35 .18	35.5 +0.1	37.42 .24	81.3 +0.3
30.2	19.45 .16	65.7 0.3	49.39 .18	83.8 0.6	34.17 .17	35.3 0.3	37.18 .23	80.8 0.8
Apr. 9.2	19.29 −.14	65.3 +0.5	49.21 −.16	83.1 +0.9	34.01 −.15	34.9 +0.5	36.96 −.21	79.7 +1.2
19.1	19.16 .11	64.7 0.7	49.06 .13	81.9 1.2	33.88 .12	34.2 0.7	36.76 .18	78.3 1.6
29.1	19.06 .08	63.9 0.9	48.95 .10	80.5 1.5	33.78 .08	33.4 0.9	36.60 .14	76.6 2.0
May 9.1	19.00 −.04	63.0 1.0	48.87 .06	78.9 1.8	33.72 −.04	32.5 1.1	36.48 .10	74.4 2.3
19.1	18.98 .00	61.9 1.2	48.83 −.02	77.0 2.0	33.69 .00	31.3 1.2	36.40 −.05	72.0 2.5
29.0	19.00 +.04	60.6 +1.3	48.83 +.03	74.9 +2.2	33.71 +.04	30.0 +1.4	36.37 .00	69.3 +2.8
June 8.0	19.07 .09	59.2 1.4	48.88 .07	72.6 2.3	33.77 .06	28.6 1.5	36.39 +.04	66.5 2.9
18.0	19.18 .13	57.7 1.5	48.97 .11	70.3 2.4	33.88 .12	27.0 1.6	36.46 .09	63.5 3.0
28.0	19.32 .16	56.1 1.6	49.10 .15	67.8 2.4	34.02 .16	25.4 1.6	36.57 .13	60.5 3.0
July 7.9	19.50 .19	54.6 1.6	49.27 .18	65.4 2.4	34.19 .19	23.8 1.6	36.73 .17	57.5 2.9
17.9	19.71 +.22	53.0 +1.5	49.47 +.21	63.1 +2.2	34.40 +.22	22.2 +1.6	36.92 +.21	54.7 +2.8
27.9	19.94 .24	51.5 1.4	49.70 .24	60.9 2.1	34.63 .24	20.7 1.5	37.15 .24	52.0 2.5
Aug. 6.8	20.19 .26	50.1 1.3	49.95 .26	59.0 1.8	34.88 .26	19.3 1.3	37.41 .27	49.7 2.2
16.8	20.46 .27	48.9 1.1	50.22 .27	57.3 1.5	35.14 .27	18.0 1.1	37.69 .29	47.6 1.8
26.8	20.74 .28	47.9 0.9	50.50 .28	56.0 1.1	35.42 .28	17.0 0.9	37.99 .31	46.1 1.3
Sept. 5.8	21.03 +.29	47.1 +0.6	50.79 +.29	55.1 +0.7	35.70 +.29	16.3 +0.6	38.30 +.32	45.0 +0.8
15.7	21.32 .29	46.6 +0.3	51.08 .29	54.6 +0.3	35.99 .29	15.8 +0.3	38.62 .32	44.4 +0.3
25.7	21.60 .28	46.5 0.0	51.37 .29	54.6 −0.2	36.28 .28	15.6 0.0	38.94 .32	44.4 −0.3
Oct. 5.7	21.88 .28	46.6 −0.3	51.65 .28	54.9 0.6	36.56 .28	15.8 −0.3	39.26 .31	45.0 0.8
15.7	22.16 .27	47.0 0.5	51.93 .27	55.8 1.0	36.83 .27	16.2 0.6	39.56 .30	46.1 1.4
25.6	22.42 +.25	47.7 −0.8	52.19 +.25	57.0 −1.4	37.09 +.25	16.9 −0.8	39.84 +.27	47.7 −1.8
Nov. 4.6	22.66 .23	48.6 1.0	52.43 .23	58.6 1.7	37.34 .23	17.9 1.0	40.10 .25	49.8 2.3
14.6	22.88 .21	49.7 1.2	52.65 .20	60.5 2.0	37.56 .21	19.0 1.2	40.34 .21	52.2 2.6
24.5	23.07 .18	50.9 1.3	52.83 .17	62.6 2.1	37.76 .18	20.3 1.3	40.53 .17	54.9 2.8
Dec. 4.5	23.24 .14	52.2 1.3	52.99 .13	64.8 2.2	37.93 .15	21.7 1.4	40.69 .13	57.8 2.9
14.5	23.36 +.11	53.6 −1.3	53.10 +.09	67.1 −2.2	38.06 +.11	23.1 −1.4	40.79 +.08	60.7 −2.9
24.5	23.45 .06	54.8 1.2	53.17 +.05	69.3 2.1	38.15 .07	24.4 1.3	40.85 +.03	63.6 2.8
34.4	23.49 +.02	56.0 −1.1	53.20 .00	71.3 −1.9	38.19 +.02	25.7 −1.2	40.86 −.02	66.4 −2.6

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Orionis.		ν Orionis.		22 Camelop. (H.)		μ Geminorum.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m 5 49	+ 7° 23′	h m 6 1	+14° 46′	h m 6 6	+69° 21′	h m 6 16	+22° 34′
	s	″	s	″	s	″	s	″
(Dec. 30.5)	10.07 +.06	3.1 −0.8	14.43 +.08	46.9 −0.4	38.32 +.14	24.5 +2.7	15.07 +.10	6.8 0.0
Jan. 9.5	10.10 +.01	2.4 0.7	14.49 +.03	46.5 0.3	38.39 +.01	27.2 2.6	15.14 +.05	6.9 +0.1
19.4	10.10 −.03	1.7 0.6	14.49 −.02	46.2 0.2	38.33 −.12	29.8 2.5	15.16 .00	7.1 0.2
29.4	10.04 .07	1.2 0.5	14.45 .06	46.0 0.1	38.15 .24	32.2 2.3	15.14 −.05	7.3 0.2
Feb. 8.4	9.95 .11	0.8 0.3	14.37 .10	45.9 −0.1	37.86 .34	34.4 2.0	15.06 .10	7.5 0.3
18.4	9.82 −.14	0.5 −0.2	14.24 −.14	45.9 0.0	37.46 −.43	36.2 +1.6	14.94 −.13	7.8 +0.3
28.3	9.67 .16	0.3 −0.1	14.09 .16	45.9 0.0	37.00 .50	37.5 1.1	14.79 .16	8.1 0.2
Mar. 10.3	9.49 .18	0.2 0.0	13.92 .18	46.0 +0.1	36.47 .53	38.4 0.6	14.61 .18	8.3 0.2
20.3	9.32 .18	0.2 +0.1	13.74 .18	46.0 0.1	35.93 .55	38.8 +0.1	14.43 .19	8.5 0.1
30.3	9.14 .17	0.4 0.2	13.56 .17	46.1 0.1	35.38 .53	38.7 −0.3	14.24 .18	8.6 +0.1
Apr. 9.2	8.98 −.15	0.6 +0.3	13.39 −.16	46.3 +0.1	34.86 −.49	38.1 −0.8	14.06 −.17	8.7 0.0
19.2	8.84 .12	1.0 0.4	13.24 .13	46.4 0.2	34.40 .43	37.1 1.2	13.90 .14	8.7 0.0
29.2	8.73 .09	1.4 0.5	13.13 .10	46.6 0.2	34.01 .35	35.6 1.6	13.77 .11	8.6 0.0
May 9.2	8.65 .05	2.0 0.6	13.05 .06	46.9 0.3	33.70 .25	33.8 1.9	13.68 .07	8.6 0.0
19.1	8.62 −.01	2.7 0.7	13.01 −.02	47.2 0.4	33.50 .15	31.8 2.1	13.63 −.03	8.6 0.0
29.1	8.63 +.03	3.5 +0.9	13.01 +.02	47.6 +0.4	33.41 −.04	29.5 −2.3	13.62 +.01	8.6 0.0
June 8.1	8.68 .07	4.4 1.0	13.05 .07	48.1 0.5	33.43 +.07	27.2 2.4	13.65 .06	8.6 0.0
18.0	8.77 .11	5.4 1.0	13.14 .11	48.6 0.6	33.55 .18	24.8 2.4	13.73 .10	8.6 +0.1
28.0	8.91 .15	6.5 1.1	13.27 .14	49.2 0.6	33.79 .29	22.5 2.3	13.85 .14	8.7 0.1
July 8.0	9.07 .18	7.6 1.1	13.43 .18	49.9 0.7	34.13 .39	20.2 2.2	14.01 .17	8.9 0.2
18.0	9.27 +.21	8.7 +1.1	13.62 +.21	50.6 +0.7	34.56 +.47	18.0 −2.0	14.20 +.21	9.0 +0.2
27.9	9.49 .23	9.8 1.1	13.85 .23	51.2 0.7	35.08 .55	16.1 1.8	14.42 .23	9.2 0.2
Aug. 6.9	9.74 .25	10.8 1.0	14.09 .26	51.9 0.6	35.67 .62	14.5 1.5	14.67 .26	9.4 0.2
16.9	10.00 .27	11.7 0.8	14.36 .27	52.5 0.5	36.32 .67	13.1 1.2	14.94 .28	9.6 0.2
26.8	10.28 .28	12.5 0.7	14.64 .29	53.0 0.4	37.02 .72	12.0 0.9	15.23 .29	9.8 0.1
Sept. 5.8	10.56 +.29	13.1 +0.5	14.93 +.30	53.4 +0.3	37.76 +.75	11.2 −0.6	15.53 +.31	9.9 +0.1
15.8	10.85 .29	13.5 +0.3	15.23 .30	53.6 +0.2	38.52 .77	10.7 −0.2	15.84 .31	9.9 0.0
25.8	11.15 .29	13.6 0.0	15.53 .30	53.7 0.0	39.30 .78	10.7 +0.1	16.15 .32	9.9 −0.1
Oct. 5.7	11.44 .29	13.5 −0.2	15.84 .30	53.6 −0.1	40.08 .77	11.0 0.5	16.47 .32	9.8 0.1
15.7	11.72 .28	13.2 0.4	16.14 .30	53.4 0.3	40.85 .76	11.6 0.8	16.79 .32	9.6 0.2
25.7	12.00 +.27	12.7 −0.6	16.43 +.29	53.1 −0.4	41.60 +.73	12.6 +1.2	17.11 +.31	9.4 −0.2
Nov. 4.7	12.27 .26	12.1 0.7	16.71 .27	52.7 0.5	42.30 .68	14.0 1.6	17.41 .29	9.1 0.3
14.6	12.51 .23	11.3 0.8	16.97 .25	52.1 0.5	42.95 .62	15.7 1.9	17.70 .28	8.9 0.3
24.6	12.73 .21	10.4 0.9	17.21 .22	51.6 0.6	43.54 .54	17.8 2.2	17.96 .25	8.6 0.2
Dec. 4.6	12.92 .17	9.5 0.9	17.42 .19	51.0 0.5	44.03 .44	20.1 2.4	18.20 .22	8.4 0.2
14.5	13.08 +.13	8.5 −0.9	17.59 +.15	50.5 −0.5	44.42 +.34	22.6 +2.6	18.40 +.18	8.3 −0.1
24.5	13.19 .09	7.6 0.9	17.73 .11	50.0 0.4	44.70 .22	25.2 2.7	18.55 .13	8.3 0.0
34.5	13.26 +.05	6.8 −0.8	17.81 +.06	49.6 −0.3	44.86 +.09	27.9 +2.7	18.66 +.08	8.3 0.0

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Argûs. (*Canopus.*)		γ Geminorum.		α Canis Majoris. (*Sirius.*)		ε Canis Majoris.	
	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *South.*
	h m 6 21	° ′ −52 37	h m 6 31	° ′ +16 29	h m 6 40	° ′ −16 33	h m 6 54	° ′ −28 49
	s	″	s	″	s	″	s	″
(Dec. 30.5)	31.21 +.01	72.1 −3.5	18.30 +.11	31.5 −0.4	16.09 +.09	56.8 −2.3	16.67 +.10	20.7 −2.9
Jan. 9.5	31.18 −.06	75.4 3.2	18.38 .06	31.1 0.3	16.16 +.04	59.1 2.2	16.75 +.04	23.5 2.7
19.4	31.08 .13	78.5 2.9	18.42 +.01	30.9 0.2	16.17 −.01	61.1 2.0	16.76 −.02	26.1 2.5
29.4	30.92 .19	81.3 2.6	18.40 −.04	30.8 −0.1	16.14 .05	63.0 1.7	16.72 .06	28.5 2.3
Feb. 8.4	30.70 .25	83.7 2.2	18.34 .08	30.8 0.0	16.07 .10	64.6 1.4	16.63 .11	30.7 1.9
18.4	30.42 −.30	85.7 −1.7	18.24 −.12	30.9 +0.1	15.95 −.13	65.9 −1.1	16.50 −.15	32.4 −1.6
28.3	30.10 .33	87.1 1.2	18.10 .15	31.0 0.1	15.80 .16	66.8 0.8	16.33 .18	33.8 1.2
Mar. 10.3	29.76 .35	88.1 0.7	17.94 .17	31.1 0.1	15.62 .18	67.5 0.5	16.13 .21	34.8 0.8
20.3	29.40 .36	88.6 −0.2	17.76 .18	31.3 0.2	15.43 .19	67.8 −0.2	15.91 .22	35.4 −0.4
30.3	29.04 .36	88.5 +0.3	17.57 .18	31.5 0.2	15.23 .19	67.8 +0.2	15.69 .22	35.6 0.0
Apr. 9.2	28.68 −.34	87.9 +0.8	17.40 −.17	31.6 +0.2	15.04 −.18	67.5 +0.5	15.47 −.21	35.3 +0.4
19.2	28.35 .31	86.8 1.3	17.24 .14	31.8 0.2	14.87 .17	66.9 0.8	15.26 .20	34.7 0.8
29.2	28.06 .28	85.2 1.8	17.11 .11	32.0 0.2	14.71 .14	66.0 1.1	15.07 .17	33.7 1.2
May 9.2	27.80 .23	83.2 2.2	17.01 .08	32.3 0.2	14.59 .11	64.7 1.3	14.92 .14	32.3 1.5
19.1	27.59 .18	80.8 2.6	16.95 −.04	32.5 0.3	14.49 .07	63.3 1.6	14.79 .11	30.6 1.8
29.1	27.44 −.12	78.1 +2.9	16.93 .00	32.8 +0.3	14.44 −.03	61.6 +1.8	14.71 −.07	28.6 +2.1
June 8.1	27.35 .06	75.1 3.1	16.95 +.04	33.1 0.4	14.42 +.01	59.7 1.9	14.66 −.03	26.3 2.3
18.0	27.32 −.01	71.9 3.3	17.01 .08	33.5 0.4	14.45 .04	57.7 2.0	14.65 +.01	23.9 2.5
28.0	27.34 +.06	68.6 3.3	17.11 .12	33.9 0.4	14.51 .08	55.6 2.1	14.69 .06	21.3 2.6
July 8.0	27.43 .12	65.2 3.3	17.24 .15	34.3 0.5	14.61 .12	53.4 2.1	14.76 .10	18.6 2.6
18.0	27.58 +.17	61.9 +3.2	17.41 +.18	34.8 +0.5	14.75 +.15	51.3 +2.1	14.88 +.13	16.0 +2.6
27.9	27.78 .23	58.8 3.0	17.61 .21	35.3 0.4	14.92 .18	49.2 2.0	15.03 .17	13.4 2.5
Aug. 6.9	28.03 .27	55.9 2.7	17.84 .24	35.7 0.4	15.11 .21	47.3 1.8	15.21 .20	11.0 2.3
16.9	28.33 .32	53.4 2.3	18.09 .26	36.0 0.3	15.33 .23	45.7 1.5	15.43 .23	8.9 2.0
26.8	28.66 .35	51.3 1.8	18.36 .27	36.3 0.2	15.58 .25	44.3 1.2	15.67 .25	7.1 1.6
Sept. 5.8	29.03 +.38	49.7 +1.3	18.64 +.29	36.5 +0.1	15.83 +.27	43.2 +0.8	15.93 +.27	5.7 +1.2
15.8	29.42 .40	48.7 0.7	18.93 .30	36.5 0.0	16.11 .28	42.6 +0.4	16.21 .29	4.7 0.7
25.8	29.82 .41	48.3 +0.1	19.24 .30	36.5 −0.2	16.40 .29	42.3 0.0	16.51 .30	4.2 +0.2
Oct. 5.7	30.23 .41	48.5 −0.6	19.54 .31	36.2 0.3	16.69 .29	42.6 −0.4	16.82 .31	4.3 −0.3
15.7	30.63 .40	49.4 1.2	19.85 .31	35.9 0.4	16.98 .29	43.2 0.9	17.14 .31	4.9 0.9
25.7	31.02 +.37	50.9 −1.8	20.16 +.30	35.4 −0.5	17.28 +.29	44.3 −1.3	17.45 +.30	6.1 −1.4
Nov. 4.7	31.38 .34	53.0 2.3	20.46 .29	34.9 0.6	17.56 .28	45.8 1.6	17.75 .29	7.7 1.8
14.6	31.71 .30	55.5 2.8	20.74 .27	34.3 0.6	17.83 .26	47.6 1.9	18.04 .28	9.7 2.2
24.6	31.98 .25	58.5 3.1	21.01 .25	33.6 0.6	18.08 .23	49.7 2.2	18.30 .25	12.1 2.5
Dec. 4.6	32.21 .19	61.8 3.3	21.25 .22	33.0 0.6	18.30 .20	52.0 2.3	18.54 .22	14[illegible] 2.8
14.5	32.37 +.13	65.2 −3.5	21.45 +.18	32.5 −0.5	18.48 +.16	54.3 −2.4	18.73 +.17	17.6 −2.9
24.5	32.46 +.06	68.7 3.5	21.61 .14	32.0 0.4	18.62 .12	56.7 2.4	18.88 .13	20.5 2.9
34.5	32.48 −.02	72.1 −3.3	21.74 +.11	31.6 −0.3	18.72 +.07	59.0 −2.3	18.99 +.08	23.4 −2.8

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Canis Majoris.		δ Geminorum.		Piazzi vii. 67.		α² Geminorum. (*Castor.*)	
	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m 7 3	° ′ −26 12	h m 7 13	° ′ +22 11	h m 7 19	° ′ +68 41	h m 7 27	° ′ +32 7
	s	″	s	″	s	″	s	″
(Dec.30.5)	53.45 +.10	64.8 −2.8	29.93 +.16	5.1 −0.2	21.18 +.33	22.6 +2.5	31.40 +.19	47.8 +0.4
Jan. 9.5	53.53 +.05	67.6 2.7	30.06 .11	5.0 0.0	21.44 .20	25.1 2.6	31.56 .13	48.3 0.6
19.5	53.56 .00	70.1 2.5	30.14 +.05	5.1 +0.1	21.58 +.07	27.8 2.6	31.66 .07	49.0 0.7
29.5	53.54 −.05	72.5 2.2	30.17 .00	5.3 0.2	21.59 −.05	30.4 2.5	31.70 +.01	49.7 0.8
Feb. 8.4	53.46 .10	74.6 1.9	30.14 −.05	5.6 0.3	21.47 .17	33.0 2.4	31.69 −.04	50.6 0.9
18.4	53.34 −.14	76.3 −1.6	30.07 −.09	5.9 +0.4	21.24 −.28	35.3 +2.2	31.62 −.09	51.5 +0.9
28.4	53.19 .17	77.7 1.2	29.95 .13	6.4 0.4	20.90 .37	37.4 1.9	31.51 .13	52.4 0.8
Mar. 10.3	53.00 .19	78.7 0.8	29.80 .16	6.8 0.4	20.49 .44	39.1 1.5	31.35 .17	53.2 0.8
20.3	52.80 .21	79.4 −0.4	29.63 .18	7.2 0.4	20.01 .49	40.4 1.0	31.17 .19	53.9 0.6
30.3	52.59 .21	79.6 0.0	29.45 .18	7.5 0.3	19.51 .51	41.2 0.6	30.98 .20	54.4 0.5
Apr. 9.3	52.37 −.21	79.4 +0.3	29.27 −.18	7.8 +0.3	18.99 −.51	41.5 +0.1	30.78 −.19	54.8 +0.3
19.2	52.17 .19	78.9 0.7	29.10 .16	8.1 0.2	18.49 .48	41.3 −0.4	30.59 .18	55.1 +0.2
29.2	51.99 .17	78.0 1.1	28.95 .14	8.3 0.2	18.03 .43	40.7 0.9	30.42 .16	55.1 0.0
May 9.2	51.83 .14	76.7 1.4	28.82 .11	8.4 0.1	17.63 .38	39.6 1.3	30.27 .13	55.0 −0.2
19.1	51.71 .11	75.1 1.7	28.73 .07	8.5 +0.1	17.30 .28	38.1 1.6	30.16 .09	54.8 0.3
29.1	51.62 −.07	73.3 +2.0	28.68 −.03	8.5 0.0	17.06 −.19	36.3 −1.9	30.09 −.05	54.5 −0.4
June 8.1	51.57 −.03	71.1 2.2	28.66 .00	8.6 0.0	16.91 −.10	34.2 2.2	30.05 −.01	54.0 0.5
18.1	51.56 +.01	68.8 2.4	28.68 +.04	8.6 0.0	16.87 .00	31.9 2.4	30.07 +.03	53.5 0.6
28.0	51.59 .05	66.4 2.5	28.75 .08	8.6 0.0	16.92 +.10	29.5 2.5	30.12 .07	52.9 0.6
July 8.0	51.66 .09	63.9 2.5	28.85 .12	8.5 0.0	17.07 .20	27.0 2.5	30.21 .11	52.3 0.6
18.0	51.77 +.12	61.3 +2.5	28.99 +.15	8.5 0.0	17.32 +.29	24.5 −2.5	30.35 +.15	51.6 −0.7
28.0	51.91 .16	58.9 2.4	29.16 .18	8.4 −0.1	17.66 .38	22.1 2.4	30.52 .18	50.9 0.7
Aug. 6.9	52.08 .19	56.6 2.2	29.35 .21	8.3 0.1	18.08 .46	19.7 2.3	30.72 .22	50.2 0.7
16.9	52.29 .22	54.5 1.9	29.58 .24	8.2 0.2	18.58 .53	17.5 2.1	30.95 .25	49.5 0.7
26.9	52.52 .24	52.7 1.6	29.83 .26	8.0 0.2	19.15 .60	15.5 1.9	31.21 .27	48.8 0.7
Sept. 5.9	52.77 +.26	51.3 +1.2	30.10 +.28	7.8 −0.3	19.78 +.65	13.8 −1.6	31.49 +.29	48.1 −0.7
15.8	53.05 .28	50.4 0.7	30.38 .29	7.4 0.4	20.45 .70	12.3 1.3	31.80 .31	47.3 0.7
25.8	53.34 .30	49.9 +0.2	30.69 .31	7.0 0.5	21.17 .73	11.1 1.0	32.12 .33	46.6 0.7
Oct. 5.8	53.64 .31	50.0 −0.3	31.00 .32	6.5 0.6	21.92 .76	10.2 0.7	32.46 .34	45.8 0.7
15.7	53.95 .31	50.5 0.9	31.32 .32	5.8 0.6	22.68 .77	9.7 −0.3	32.81 .35	45.1 0.7
25.7	54.26 +.31	51.6 −1.3	31.65 +.33	5.2 −0.7	23.45 +.77	9.6 +0.1	33.17 +.36	44.4 −0.6
Nov. 4.7	54.56 .30	53.1 1.7	31.98 .32	4.5 0.7	24.21 .75	9.9 0.5	33.53 .36	43.8 0.5
14.7	54.85 .28	55.1 2.1	32.30 .31	3.9 0.6	24.95 .72	10.6 0.9	33.88 .35	43.4 0.4
24.6	55.12 .26	57.4 2.4	32.61 .29	3.2 0.6	25.64 .66	11.7 1.3	34.22 .33	43.0 0.3
Dec. 4.6	55.36 .22	60.0 2.6	32.89 .27	2.7 0.5	26.28 .59	13.3 1.7	34.54 .30	42.8 −0.1
14.6	55.57 +.18	62.7 −2.8	33.14 +.23	2.2 −0.4	26.83 +.50	15.1 +2.0	34.82 +.27	42.9 +0.1
24.6	55.73 .13	65.5 2.8	33.35 .19	1.9 0.3	27.29 .40	17.3 2.3	35.07 .22	43.0 0.3
34.5	55.85 +.08	68.3 −2.7	33.52 +.14	1.7 −0.1	27.63 +.28	19.7 +2.5	35.27 +.17	43.4 +0.5

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Canis Minoris. (*Procyon*.)		β Geminorum. (*Pollux*.)		φ Geminorum.		3 Ursæ Majoris (H.)	
	Right Ascension.	Declination *North*.	Right Ascension.	Declination *North*.	Right Ascension.	Declination *North*.	Right Ascension.	Declination *North*.
	h m 7 33	+ 5° 30′	h m 7 38	+28° 17′	h m 7 46	+27° 2′	h m 8 1	+68° 47′
	s	″	s	″	s	″	s	″
(Dec. 30.5)	29.83 +.16	29.6 −1.3	31.68 +.19	32.1 +0.1	42.49 +.20	64.1 0.0	47.06 +.43	51.2 +2.0
Jan. 9.5	29.97 .11	28.4 1.1	31.85 .14	32.3 0.3	42.66 .15	64.2 +0.2	47.44 .31	53.5 2.4
19.5	30.05 .06	27.4 1.0	31.96 .08	32.7 0.5	42.78 .09	64.5 0.4	47.69 .19	56.0 2.6
29.5	30.09 +.01	26.5 0.8	32.01 +.03	33.3 0.6	42.85 +.04	64.9 0.5	47.81 +.06	58.7 2.7
Feb. 8.4	30.08 −.04	25.8 0.6	32.01 −.03	33.9 0.7	42.85 −.02	65.5 0.6	47.80 −.07	61.3 2.6
18.4	30.02 −.08	25.3 −0.4	31.96 −.08	34.6 +0.7	42.81 −.07	66.2 +0.7	47.67 −.19	63.9 +2.5
28.4	29.92 .11	25.0 0.2	31.86 .12	35.4 0.7	42.72 .11	66.9 0.7	47.42 .30	66.3 2.2
Mar. 10.3	29.79 .14	24.8 −0.1	31.71 .15	36.1 0.7	42.59 .15	67.6 0.7	47.08 .38	68.4 1.9
20.3	29.64 .16	24.8 0.0	31.55 .17	36.7 0.6	42.43 .17	68.2 0.6	46.66 .45	70.2 1.5
30.3	29.47 .17	24.9 +0.2	31.37 .19	37.3 0.5	42.25 .18	68.8 0.5	46.18 .49	71.5 1.1
Apr. 9.3	29.30 −.17	25.1 +0.3	31.18 −.19	37.8 +0.4	42.07 −.18	69.3 +0.4	45.68 −.50	72.3 +0.6
19.2	29.14 .16	25.5 0.4	30.99 .18	38.1 0.3	41.88 .17	69.7 0.3	45.18 .49	72.6 +0.1
29.2	28.99 .14	25.9 0.5	30.82 .16	38.3 +0.1	41.72 .15	70.0 0.2	44.69 .47	72.5 −0.4
May 9.2	28.86 .11	26.4 0.6	30.68 .13	38.3 0.0	41.57 .13	70.1 +0.1	44.25 .42	71.9 0.8
19.2	28.76 .08	27.0 0.7	30.56 .10	38.3 −0.1	41.46 .10	70.1 0.0	43.86 .35	70.8 1.3
29.1	28.69 −.05	27.7 +0.7	30.49 −.06	38.1 −0.2	41.38 −.06	70.0 −0.1	43.54 −.28	69.4 −1.6
June 8.1	28.66 −.02	28.5 0.8	30.45 −.02	37.9 0.3	41.34 −.02	69.8 0.2	43.30 .19	67.5 2.0
18.1	28.66 +.02	29.3 0.8	30.45 +.02	37.6 0.4	41.33 +.01	69.6 0.3	43.16 −.10	65.4 2.2
28.0	28.69 .05	30.1 0.9	30.49 .06	37.2 0.4	41.36 .05	69.3 0.3	43.11 .00	63.1 2.4
July 8.0	28.76 .09	31.0 0.9	30.57 .10	36.7 0.5	41.43 .09	68.9 0.4	43.15 +.09	60.6 2.0
18.0	28.86 +.12	31.9 +0.8	30.68 +.13	36.3 −0.5	41.54 +.13	68.5 −0.4	43.29 +.18	57.9 −2.6
28.0	29.00 .15	32.7 0.8	30.83 .17	35.8 0.5	41.69 .16	68.0 0.5	43.52 .28	55.3 2.6
Aug. 6.9	29.16 .17	33.4 0.7	31.02 .20	35.2 0.6	41.86 .19	67.5 0.5	43.84 .36	52.7 2.6
16.9	29.34 .20	34.0 0.5	31.23 .22	34.6 0.6	42.06 .22	67.0 0.6	44.25 .44	50.1 2.5
26.9	29.55 .22	34.4 0.4	31.47 .25	34.0 0.7	42.29 .24	66.3 0.7	44.73 .51	47.7 2.4
Sept. 5.9	29.79 +.24	34.7 +0.2	31.73 +.28	33.3 −0.7	42.55 +.27	65.7 −0.7	45.27 +.58	45.4 −2.2
15.8	30.04 .26	34.7 −0.1	32.02 .30	32.6 0.7	42.83 .29	64.9 0.8	45.89 .64	43.3 1.9
25.8	30.31 .28	34.5 0.3	32.32 .31	31.8 0.8	43.13 .31	64.1 0.8	46.55 .69	41.5 1.6
Oct. 5.8	30.59 .29	34.1 0.6	32.64 .33	31.0 0.8	43.44 .32	63.3 0.9	47.26 .73	40.0 1.2
15.7	30.89 .30	33.4 0.8	32.98 .34	30.2 0.8	43.77 .34	62.4 0.9	48.00 .76	38.9 1.0
25.7	31.19 +.30	32.5 −1.0	33.32 +.35	29.4 −0.8	44.11 +.34	61.5 −0.9	48.77 +.77	38.1 −0.6
Nov. 4.7	31.49 .30	31.3 1.2	33.67 .35	28.7 0.7	44.46 .35	60.7 0.8	49.55 .77	37.7 −0.1
14.7	31.80 .30	30.0 1.3	34.02 .34	28.0 0.6	44.81 .34	59.9 0.7	50.32 .76	37.8 +0.3
24.6	32.09 .28	28.7 1.4	34.35 .32	27.4 0.5	45.14 .32	59.2 0.6	51.06 .72	38.3 0.7
Dec. 4.6	32.36 .26	27.2 1.5	34.66 .30	27.0 0.4	45.46 .30	58.6 0.5	51.77 .67	39.3 1.2
14.6	32.60 +.23	25.7 −1.4	34.95 +.27	26.7 −0.2	45.75 +.27	58.2 −0.3	52.40 +.59	40.7 +1.6
24.6	32.81 .19	24.3 1.3	35.19 .22	26.6 0.0	46.00 .23	58.0 −0.1	52.95 .50	42.5 2.0
34.5	32.98 +.14	23.0 −1.2	35.40 +.18	26.7 +0.2	46.21 +.18	58.0 +0.1	53.40 +.39	44.7 +2.4

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	15 Argûs (ρ)		η Cancri.		ε Hydræ.		ι Ursæ Majoris.	
	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m 8 2	−23° 58′	h m 8 26	+20° 48′	h m 8 40	+ 6° 49′	h m 8 51	+48° 28′
	s	″	s	″	s	″	s	″
(Dec.30.6)	49.66 +.17	63.5 −2.8	17.56 +.22	59.4 −0.5	54.04 +.22	30.3 −1.4	36.54 +.33	28.6 +0.8
Jan. 9.5	49.80 .12	66.3 2.7	17.77 .18	59.0 0.3	54.24 .18	28.9 1.2	36.84 .27	29.6 1.1
19.5	49.90 .07	69.0 2.6	17.92 .13	58.7 −0.1	54.40 .13	27.8 1.0	37.07 .20	30.9 1.4
29.5	49.94 +.01	71.5 2.4	18.02 .07	58.7 +0.1	54.50 .08	26.9 0.8	37.24 .13	32.5 1.6
Feb. 8.5	49.93 −.04	73.8 2.2	18.07 +.02	58.9 0.3	54.56 +.03	26.1 0.6	37.33 +.06	34.2 1.8
18.4	49.87 −.08	75.9 −1.9	18.07 −.03	59.2 +0.4	54.56 −.02	25.6 −0.4	37.35 −.02	36.1 +1.9
28.4	49.76 .12	77.6 1.5	18.01 .07	59.7 0.5	54.52 .06	25.3 −0.2	37.30 .08	37.9 1.8
Mar. 10.4	49.62 .15	78.9 1.2	17.92 .11	60.2 0.6	54.44 .10	25.2 0.0	37.19 .14	39.8 1.8
20.4	49.45 .18	79.9 0.8	17.79 .14	60.8 0.6	54.33 .12	25.2 +0.1	37.03 .18	41.5 1.6
30.3	49.27 .19	80.5 0.4	17.64 .16	61.4 0.6	54.19 .14	25.4 0.2	36.82 .22	43.0 1.4
Apr. 9.3	49.07 −.19	80.8 −0.1	17.48 −.16	62.0 +0.6	54.04 −.15	25.7 +0.3	36.59 −.24	44.2 +1.1
19.3	48.88 .19	80.7 +0.3	17.31 .16	62.5 0.5	53.89 .15	26.1 0.4	36.35 .24	45.1 0.8
29.3	48.69 .18	80.3 0.6	17.15 .15	63.0 0.4	53.74 .14	26.5 0.5	36.11 .24	45.7 0.4
May 9.2	48.53 .16	79.5 1.0	17.01 .13	63.3 0.3	53.60 .13	27.1 0.6	35.88 .22	45.9 +0.1
19.2	48.38 .13	78.4 1.3	16.88 .11	63.7 0.3	53.48 .11	27.6 0.6	35.67 .19	45.8 −0.3
29.2	48.26 −.10	77.0 +1.5	16.78 −.08	63.9 +0.2	53.38 −.09	28.3 +0.6	35.50 −.16	45.4 −0.6
June 8.1	48.18 .07	75.3 1.8	16.71 .05	64.0 0.1	53.30 .06	28.9 0.7	35.36 .12	44.6 0.9
18.1	48.12 −.04	73.4 2.0	16.68 −.02	64.1 +0.1	53.26 −.03	29.6 0.7	35.26 .08	43.5 1.2
28.1	48.10 .00	71.3 2.1	16.68 +.01	64.1 0.0	53.24 .00	30.2 0.7	35.20 −.03	42.3 1.4
July 8.1	48.11 +.03	69.1 2.2	16.71 .04	64.1 −0.1	53.25 +.03	30.9 0.6	35.19 +.02	40.8 1.6
18.0	48.16 +.07	66.8 +2.3	16.77 +.08	63.9 −0.2	53.29 +.06	31.5 +0.6	35.23 +.06	39.1 −1.8
28.0	48.25 .10	64.6 2.2	16.87 .11	63.7 0.3	53.37 .09	32.1 0.5	35.32 .11	37.2 1.9
Aug. 7.0	48.36 .13	62.4 2.1	16.99 .14	63.4 0.4	53.47 .11	32.6 0.4	35.45 .15	35.3 2.0
17.0	48.51 .16	60.4 1.9	17.15 .17	63.0 0.5	53.59 .14	32.9 0.3	35.62 .19	33.3 2.0
26.9	48.69 .19	58.6 1.6	17.33 .20	62.5 0.6	53.75 .17	33.1 +0.1	35.83 .23	31.2 2.1
Sept. 5.9	48.90 +.22	57.1 +1.3	17.54 +.22	61.9 −0.7	53.93 +.19	33.2 −0.1	36.09 +.27	29.2 −2.1
15.9	49.14 .25	56.0 0.9	17.78 .25	61.1 0.8	54.14 .22	33.0 0.3	36.38 .31	27.1 2.0
25.8	49.40 .27	55.4 +0.4	18.04 .27	60.2 0.9	54.37 .25	32.6 0.5	36.71 .35	25.1 1.9
Oct. 5.8	49.68 .29	55.2 0.0	18.32 .29	59.3 1.0	54.63 .27	31.9 0.8	37.08 .38	23.3 1.8
15.8	49.98 .31	55.5 −0.5	18.63 .31	58.2 1.1	54.91 .29	31.0 1.0	37.48 .41	21.5 1.7
25.8	50.29 +.31	56.3 −1.0	18.95 +.33	57.0 −1.2	55.21 +.30	29.9 −1.2	37.90 +.43	20.0 −1.4
Nov. 4.7	50.61 .32	57.5 1.5	19.28 .34	55.8 1.2	55.52 .31	28.6 1.4	38.34 .45	18.6 1.2
14.7	50.92 .31	59.3 1.9	19.62 .34	54.5 1.2	55.84 .32	27.2 1.5	38.80 .46	17.6 0.9
24.7	51.23 .29	61.3 2.2	19.96 .33	53.3 1.1	56.16 .31	25.6 1.6	39.26 .45	16.9 0.6
Dec. 4.7	51.51 .27	63.8 2.5	20.28 .31	52.3 1.0	56.47 .30	24.0 1.6	39.70 .44	16.5 −0.2
14.6	51.77 +.24	66.4 −2.7	20.58 +.29	51.3 −0.9	56.76 +.28	22.3 −1.6	40.13 +.41	16.5 +0.2
24.6	51.99 .20	69.1 2.8	20.86 .26	50.5 0.7	57.02 .25	20.8 1.5	40.52 .36	16.8 0.5
34.6	52.17 +.15	71.9 −2.8	21.10 +.21	49.9 −0.5	57.25 +.21	19.3 −1.3	40.86 +.31	17.6 +0.9

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	σ² Ursæ Majoris.		κ Cancri.		ι Argûs.		1 Draconis (H.)	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*
	h m 9 0	° ′ +67 34	h m 9 1	° ′ +11 6	h m 9 14	° ′ −58 48	h m 9 21	° ′ +81 48
	s	″	s	″	s	″	s	″
(Dec. 30.6)	37.93 +.53	54.1 +1.6	44.20 +.24	50.2 −1.2	8.82 +.30	21.2 −3.4	15.77+1.36	46.2 +1.9
Jan. 9.6	38.41 .43	55.9 2.0	44.42 .20	49.0 1.0	9.09 .23	24.7 3.6	17.02 1.12	48.4 2.3
19.6	38.79 .32	58.1 2.3	44.60 .15	48.0 0.8	9.28 .15	28.4 3.7	18.01 .85	50.9 2.7
29.5	39.06 .20	60.6 2.5	44.73 .10	47.3 0.6	9.39 +.06	32.2 3.7	18.72 .55	53.8 2.9
Feb. 8.5	39.20 +.08	63.2 2.7	44.81 +.05	46.8 0.4	9.41 −.02	35.9 3.6	19.11+ .24	56.8 3.1
18.5	39.22 −.04	65.9 +2.7	44.83 .00	46.5 −0.2	9.35 −.10	39.4 −3.4	19.20− .07	59.9 +3.1
28.4	39.13 .15	68.5 2.6	44.82 −.04	46.4 0.0	9.22 .17	42.7 3.2	18.98 .37	63.0 3.0
Mar. 10.4	38.92 .25	71.0 2.4	44.75 .08	46.5 +0.2	9.02 .23	45.7 2.8	18.47 .64	65.9 2.8
20.4	38.63 .33	73.3 2.1	44.66 .11	46.8 0.3	8.76 .28	48.4 2.4	17.70 .87	68.5 2.4
30.4	38.26 .40	75.2 1.7	44.53 .13	47.1 0.4	8.46 .32	50.6 2.0	16.72 1.06	70.8 2.0
Apr. 9.3	37.83 −.44	76.7 +1.3	44.39 −.14	47.5 +0.5	8.12 −.35	52.4 −1.5	15.57−1.21	72.5 +1.5
19.3	37.38 .46	77.8 0.8	44.25 .15	48.0 0.5	7.76 .37	53.7 1.0	14.31 1.29	73.7 1.0
29.3	36.92 .45	78.3 +0.3	44.10 .14	48.5 0.5	7.39 .37	54.5 −0.5	12.98 1.33	74.5 +0.5
May 9.3	36.48 .43	78.4 −0.2	43.96 .13	49.1 0.5	7.01 .37	54.8 0.0	11.65 1.31	74.6 −0.1
19.2	36.06 .40	78.0 0.6	43.83 .12	49.6 0.5	6.65 .35	54.5 +0.5	10.36 1.25	74.2 0.7
29.2	35.68 −.34	77.2 −1.1	43.72 −.09	50.1 +0.5	6.31 −.33	53.8 +1.0	9.16−1.14	73.2 −1.2
June 8.2	35.37 .28	75.9 1.5	43.64 .07	50.7 0.5	5.99 .30	52.5 1.5	8.09 1.00	71.7 1.7
18.1	35.12 .21	74.2 1.9	43.58 .04	51.2 0.5	5.71 .26	50.8 1.9	7.17 .82	69.8 2.1
28.1	34.95 .13	72.2 2.1	43.55 −.02	51.6 0.4	5.47 .22	48.8 2.3	6.44 .63	67.4 2.5
July 8.1	34.86 −.05	69.9 2.4	43.55 +.01	52.0 0.4	5.28 .17	46.3 2.6	5.92 .42	64.8 2.8
18.1	34.85 +.03	67.3 −2.6	43.58 +.04	52.4 +0.3	5.14 −.11	43.6 +2.8	5.61− .19	61.8 −3.1
28.0	34.92 .11	64.6 2.8	43.63 .07	52.7 0.2	5.06 −.05	40.6 3.0	5.53+ .03	58.6 3.2
Aug. 7.0	35.08 .20	61.8 2.8	43.72 .10	52.8 +0.1	5.04 +.01	37.6 3.1	5.68 .26	55.3 3.3
17.0	35.32 .28	58.9 2.9	43.83 .13	52.9 0.0	5.09 .08	34.5 3.0	6.05 .49	51.9 3.4
27.0	35.63 .35	56.1 2.8	43.97 .15	52.8 −0.2	5.20 .15	31.5 2.9	6.66 .71	48.6 3.3
Sept. 5.9	36.03 +.43	53.3 −2.7	44.13 +.18	52.5 −0.4	5.39 +.21	28.7 +2.6	7.47+ .92	45.3 −3.2
15.9	36.49 .50	50.6 2.6	44.33 .21	52.1 0.6	5.63 .28	26.3 2.3	8.50 1.13	42.2 3.0
25.9	37.02 .56	48.1 2.4	44.55 .24	51.4 0.8	5.95 .34	24.2 1.8	9.71 1.30	39.3 2.8
Oct. 5.8	37.61 .62	45.8 2.1	44.80 .26	50.6 1.0	6.32 .39	22.6 1.3	11.09 1.46	36.6 2.5
15.8	38.25 .66	43.8 1.8	45.07 .28	49.5 1.2	6.73 .44	21.6 0.7	12.63 1.60	34.3 2.1
25.8	38.94 +.70	42.1 −1.5	45.37 +.30	48.2 −1.3	7.19 +.47	21.2 +0.1	14.29+1.71	32.5 −1.7
Nov. 4.8	39.66 .73	40.8 1.1	45.68 .32	46.8 1.5	7.67 .49	21.4 −0.6	16.05 1.78	31.0 1.2
14.7	40.39 .74	40.0 0.6	46.01 .33	45.3 1.6	8.16 .49	22.4 1.2	17.86 1.82	30.1 0.6
24.7	41.13 .73	39.6 −0.1	46.34 .33	43.7 1.6	8.65 .48	23.9 1.8	19.68 1.81	29.7 −0.1
Dec. 4.7	41.85 .70	39.7 +0.4	46.66 .32	42.1 1.6	9.12 .45	26.0 2.4	21.48 1.75	29.9 +0.5
14.7	42.54 +.65	40.3 +0.8	46.97 +.30	40.6 −1.5	9.55 +.41	28.7 −2.9	23.19+1.64	30.7 +1.0
24.6	43.16 .59	41.4 1.3	47.25 .27	39.1 1.4	9.93 .35	31.7 3.2	24.77 1.49	32.0 1.6
34.6	43.71 +.51	42.9 +1.8	47.50 +.23	37.8 −1.2	10.25 +.28	35.2 −3.6	26.16+1.33	33.8 +2.1

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Hydræ.		δ Ursæ Majoris.		θ Ursæ Majoris.		ε Leonis.	
	Right Ascension.	Declination *South*.	Right Ascension.	Declination *North*.	Right Ascension.	Declination *North*.	Right Ascension.	Declination *North*.
	h m 9 22	° ′ − 8 10	h m 9 24	° ′ +70 18	h m 9 25	° ′ +52 10	h m 9 39	° ′ +24 16
	s	″	s	″	s	″	s	″
(Dec. 30.6)	8.12 +.24	37.5 −2.2	40.07 +.64	52.0 +1.4	25.85 +.39	48.3 +0.7	32.90 +.29	61.3 −0.8
Jan. 9.6	8.34 .20	39.7 2.1	40.66 .53	53.7 1.9	26.21 .33	49.2 1.1	33.17 .25	60.6 0.5
19.6	8.52 .16	41.8 2.0	41.14 .41	55.8 2.3	26.50 .26	50.4 1.4	33.40 .20	60.3 −0.2
29.5	8.66 .11	43.7 1.8	41.49 .29	58.2 2.6	26.73 .19	52.0 1.7	33.58 .15	60.2 +0.1
Feb. 8.5	8.75 .06	45.4 1.6	41.71 .15	60.9 2.7	26.87 .11	53.9 1.9	33.71 .10	60.4 0.3
18.5	8.78 +.01	46.9 −1.4	41.80 +.02	63.7 +2.8	26.94 +.03	55.9 +2.1	33.78 +.05	60.9 +0.6
28.4	8.77 −.03	48.1 1.1	41.74 −.12	66.5 2.7	26.93 −.04	58.1 2.1	33.80 .00	61.6 0.7
Mar. 10.4	8.72 .07	49.1 0.8	41.57 .23	69.2 2.6	26.85 .11	60.1 2.1	33.77 −.05	62.4 0.9
20.4	8.64 .10	49.8 0.6	41.28 .33	71.7 2.3	26.71 .16	62.1 1.9	33.70 .09	63.3 0.9
30.4	8.52 .12	50.3 0.3	40.90 .41	73.9 2.0	26.52 .21	64.0 1.7	33.60 .12	64.3 0.9
Apr. 9.3	8.39 −.14	50.5 −0.1	40.45 −.47	75.7 +1.6	26.30 −.24	65.5 +1.4	33.47 −.14	65.2 +0.9
19.3	8.25 .14	50.5 +0.1	39.95 .51	77.0 1.1	26.05 .25	66.8 1.1	33.33 .15	66.1 0.9
29.3	8.10 .14	50.3 0.3	39.44 .52	77.9 0.6	25.79 .26	67.7 0.7	33.18 .15	66.9 0.7
May 9.3	7.96 .14	49.9 0.5	38.92 .51	78.2 +0.1	25.53 .25	68.2 +0.3	33.03 .14	67.6 0.6
19.2	7.83 .13	49.3 0.7	38.42 .48	78.0 −0.4	25.29 .23	68.3 0.0	32.89 .13	68.2 0.5
29.2	7.71 −.11	48.5 +0.9	37.96 −.43	77.4 −0.9	25.07 −.20	68.1 −0.4	32.76 −.12	68.6 +0.3
June 8.2	7.61 .09	47.6 1.0	37.56 .37	76.2 1.4	24.89 .17	67.5 0.8	32.66 .10	68.8 +0.2
18.1	7.53 .07	46.5 1.1	37.22 .30	74.7 1.8	24.74 .13	66.5 1.1	32.57 .07	68.9 0.0
28.1	7.48 .04	45.4 1.2	36.96 .22	72.7 2.1	24.63 .06	65.2 1.4	32.51 .05	68.9 −0.1
July 8.1	7.45 −.02	44.1 1.3	36.78 .13	70.4 2.4	24.57 −.04	63.6 1.7	32.48 −.02	68.6 0.3
18.1	7.44 +.01	42.9 +1.3	36.69 −.04	67.8 −2.7	24.55 +.01	61.8 −1.9	32.47 +.01	68.3 −0.4
28.0	7.47 .04	41.6 1.2	36.70 +.05	65.0 2.9	24.58 .05	59.8 2.1	32.50 .04	67.8 0.6
Aug. 7.0	7.52 .07	40.4 1.2	36.80 .14	62.1 3.0	24.66 .10	57.6 2.3	32.55 .07	67.1 0.7
17.0	7.60 .09	39.3 1.1	36.98 .23	59.0 3.1	24.79 .15	55.3 2.4	32.63 .10	66.3 0.9
27.0	7.71 .12	38.3 0.9	37.26 .32	56.0 3.1	24.96 .20	52.9 2.4	32.74 .13	65.3 1.1
Sept. 5.9	7.84 +.15	37.6 +0.6	37.63 +.41	52.9 −3.0	25.18 +.24	50.4 −2.4	32.89 +.16	64.2 −1.2
15.9	8.01 .18	37.1 +0.3	38.09 .49	50.0 2.9	25.45 .29	48.0 2.4	33.06 .19	62.9 1.3
25.9	8.21 .21	36.9 0.0	38.62 .57	47.2 2.7	25.76 .33	45.6 2.4	33.27 .22	61.5 1.5
Oct. 5.8	8.44 .24	37.0 −0.3	39.22 .64	44.6 2.5	26.11 .37	43.3 2.3	33.51 .25	59.9 1.6
15.8	8.69 .27	37.5 0.7	39.90 .71	42.2 2.2	26.50 .41	41.1 2.1	33.78 .28	58.3 1.7
25.8	8.98 +.29	38.4 −1.0	40.63 +.76	40.2 −1.8	26.93 +.44	39.1 −1.9	34.07 +.31	56.6 −1.7
Nov. 4.8	9.28 .31	39.6 1.4	41.41 .79	38.6 1.4	27.38 .47	37.4 1.6	34.40 .33	54.9 1.7
14.7	9.59 .32	41.1 1.7	42.22 .82	37.5 0.9	27.86 .48	35.9 1.3	34.74 .35	53.2 1.7
24.7	9.91 .32	42.9 1.9	43.05 .82	36.8 −0.4	28.35 .49	34.8 0.9	35.09 .35	51.5 1.6
Dec. 4.7	10.23 .31	44.9 2.1	43.86 .80	36.6 +0.1	28.83 .48	34.1 0.5	35.45 .35	50.0 1.4
14.7	10.53 +.29	47.1 −2.2	44.65 +.78	37.0 +0.6	29.31 +.46	33.9 −0.1	35.79 +.34	48.7 −1.2
24.6	10.82 .27	49.3 2.2	45.38 .69	37.9 1.2	29.75 .42	34.0 +0.4	36.12 .32	47.5 1.0
34.6	11.07 +.23	51.5 −2.2	46.03 +.60	39.3 +1.6	30.15 +.37	34.6 +0.8	36.42 +.28	46.7 −0.7

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	μ Leonis.		α Leonis. (*Regulus.*)		32 Ursæ Majoris.		γ¹ Leonis.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m 9 46	° ′ +26 31	h m 10 2	° ′ +12 30	h m 10 9	° ′ +65 39	h m 10 13	° ′ +20 23
	s	″	s	″	s	″	s	″
(Dec. 30.6)	26.87 +.30	40.8 −0.7	27.44 +.29	32.5 −1.5	58.11 +.59	29.8 +0.8	50.89 +.30	66.6 −1.2
Jan. 9.6	27.15 .26	40.2 0.4	27.71 .25	31.2 1.2	58.67 .53	30.8 1.3	51.18 .27	65.5 0.9
19.6	27.39 .22	40.0 −0.1	27.95 .21	30.1 1.0	59.16 .44	32.3 1.7	51.43 .23	64.8 0.6
29.6	27.58 .16	40.0 +0.2	28.14 .16	29.2 0.7	59.56 .34	34.3 2.1	51.64 .18	64.4 −0.3
Feb. 8.5	27.72 .11	40.4 0.5	28.28 .11	28.6 0.4	59.85 .24	36.5 2.4	51.80 .13	64.2 0.0
18.5	27.80 +.05	40.9 +0.7	28.37 +.06	28.3 −0.2	60.03 +.13	39.1 +2.6	51.91 +.08	64.4 +0.3
28.5	27.83 .00	41.7 0.9	28.41 +.02	28.3 0.0	60.10 +.02	41.8 2.7	51.97 +.03	64.8 0.5
Mar. 10.5	27.80 −.04	42.7 1.0	28.40 −.02	28.4 +0.2	60.07 −.08	44.5 2.7	51.97 −.01	65.4 0.7
20.4	27.74 .08	43.7 1.1	28.36 .06	28.7 0.4	59.93 .18	47.2 2.5	51.94 .05	66.1 0.8
30.4	27.64 .11	44.8 1.1	28.28 .09	29.2 0.5	59.71 .26	49.6 2.3	51.87 .08	67.0 0.9
Apr. 9.4	27.51 −.14	45.9 +1.0	28.17 −.11	29.8 +0.6	59.42 −.31	51.8 +2.0	51.77 −.11	67.9 +0.9
19.3	27.37 .15	46.8 0.9	28.05 .12	30.4 0.6	59.07 .35	53.6 1.6	51.65 .12	68.8 0.9
29.3	27.22 .15	47.7 0.8	27.92 .13	31.1 0.7	58.69 .39	55.0 1.1	51.52 .13	69.7 0.8
May 9.3	27.06 .15	48.4 0.7	27.79 .13	31.7 0.6	58.29 .40	55.9 0.7	51.39 .13	70.5 0.7
19.3	26.92 .14	49.0 0.5	27.66 .12	32.4 0.6	57.89 .39	56.4 +0.2	51.26 .13	71.2 0.6
29.2	26.79 −.12	49.4 +0.3	27.55 −.11	33.0 +0.6	57.51 −.37	56.3 −0.3	51.13 −.12	71.8 +0.5
June 8.2	26.67 .10	49.6 +0.1	27.44 .10	33.5 0.5	57.15 .34	55.8 0.8	51.02 .10	72.2 0.4
18.2	26.58 .08	49.7 0.0	27.36 .08	34.0 0.4	56.83 .29	54.8 1.2	50.92 .09	72.5 0.2
28.2	26.52 .05	49.6 −0.2	27.29 .06	34.4 0.4	56.56 .24	53.3 1.6	50.85 .07	72.7 +0.1
July 8.1	26.48 −.03	49.2 0.4	27.24 .03	34.7 0.3	56.35 .18	51.5 2.0	50.79 .04	72.7 −0.1
18.1	26.47 .00	48.8 −0.6	27.21 −.01	34.9 +0.2	56.20 −.12	49.3 −2.3	50.76 −.02	72.6 −0.2
28.1	26.48 +.03	48.1 0.7	27.22 +.01	35.0 0.0	56.11 −.05	46.8 2.6	50.75 .00	72.3 0.4
Aug. 7.0	26.53 .06	47.3 0.9	27.24 .03	35.0 −0.1	56.09 +.02	44.1 2.8	50.77 +.03	71.8 0.6
17.0	26.60 .09	46.3 1.0	27.29 .07	34.9 0.2	56.15 .09	41.2 3.0	50.81 .06	71.1 0.7
27.0	26.71 .12	45.2 1.2	27.37 .09	34.5 0.4	56.27 .16	38.1 3.1	50.88 .09	70.3 0.9
Sept. 6.0	26.85 +.15	43.9 −1.3	27.48 +.12	34.0 −0.6	56.47 +.23	35.0 −3.1	50.99 +.12	69.3 −1.1
15.9	27.02 .19	42.5 1.5	27.62 .16	33.3 0.8	56.74 .31	31.8 3.1	51.12 .15	68.1 1.3
25.9	27.22 .22	41.0 1.6	27.79 .19	32.4 1.0	57.08 .38	28.7 3.1	51.29 .19	66.8 1.4
Oct. 5.9	27.46 .25	39.3 1.7	28.00 .22	31.3 1.2	57.49 .45	25.7 2.9	51.49 .22	65.2 1.6
15.9	27.72 .28	37.6 1.8	28.23 .25	30.0 1.4	57.98 .51	22.9 2.7	51.73 .25	63.5 1.7
25.8	28.02 +.31	35.8 −1.8	28.50 +.27	28.5 −1.6	58.52 +.57	20.3 −2.4	52.00 +.28	61.7 −1.8
Nov. 4.8	28.35 .33	34.0 1.8	28.79 .30	26.8 1.7	59.12 .62	18.0 2.1	52.30 .31	59.9 1.9
14.8	28.69 .35	32.2 1.7	29.11 .32	25.0 1.8	59.76 .65	16.1 1.7	52.62 .33	57.9 1.9
24.7	29.05 .36	30.5 1.6	29.44 .33	23.2 1.8	60.43 .68	14.7 1.2	52.96 .34	56.0 1.9
Dec. 4.7	29.41 .36	29.0 1.4	29.77 .33	21.3 1.8	61.11 .68	13.7 0.7	53.31 .35	54.2 1.7
14.7	29.76 +.35	27.7 −1.2	30.11 +.33	19.5 −1.7	61.79 +.67	13.3 −0.2	53.66 +.34	52.5 −1.6
24.7	30.10 .32	26.6 0.9	30.43 .31	17.9 1.6	62.45 .63	13.4 +0.4	54.00 .33	51.0 1.4
34.6	30.41 +.29	25.8 −0.6	30.72 +.27	16.4 −1.4	63.05 +.57	14.1 +0.9	54.32 +.30	49.8 −1.1

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	9 Draconis (H.)		ρ Leonis.		η Argûs.		ι Leonis.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*
	h m 10 25	+76° 16′	h m 10 26	+ 9° 52′	h m 10 40	−59° 5′	h m 10 43	+11° 7′
	s	″	s	″	s	″	s	″
(Dec.30.6)	39.50 +.99	50.7 +0.9	57.73 +.30	38.8 −1.7	46.25 +.44	44.7 −2.8	25.01 +.31	56.1 −1.7
Jan. 9.6	40.45 .88	51.9 1.5	58.02 .27	37.2 1.4	46.66 .38	47.7 3.2	25.31 .28	54.6 1.5
19.6	41.27 .75	53.6 2.0	58.27 .23	35.9 1.2	47.01 .31	51.1 3.4	25.57 .24	53.2 1.2
29.6	41.96 .60	55.8 2.4	58.48 .18	34.8 0.9	47.29 .24	54.6 3.6	25.79 .20	52.2 0.9
Feb. 8.5	42.47 .42	58.4 2.7	58.64 .14	34.0 0.7	47.49 .16	58.3 3.7	25.97 .15	51.4 0.6
18.5	42.80 +.24	61.2 +2.9	58.75 +.09	33.5 −0.4	47.61 +.08	62.0 −3.7	26.10 +.11	50.9 −0.4
28.5	42.94 +.05	64.2 3.0	58.81 +.04	33.2 −0.1	47.66 +.01	65.6 3.6	26.18 .06	50.7 −0.1
Mar. 10.5	42.90 −.13	67.3 3.0	58.83 .00	33.2 +0.1	47.63 −.06	69.1 3.4	26.22 +.02	50.7 +0.1
20.4	42.69 .29	70.2 2.8	58.81 −.04	33.4 0.3	47.53 .13	72.4 3.1	26.22 −.02	51.0 0.3
30.4	42.32 .44	72.9 2.6	58.76 .07	33.7 0.4	47.38 .19	75.4 2.8	26.17 .06	51.4 0.5
Apr. 9.4	41.82 −.55	75.3 +2.2	58.67 −.09	34.2 +0.5	47.17 −.23	78.0 −2.4	26.10 −.08	51.9 +0.6
19.4	41.21 .65	77.3 1.8	58.57 .11	34.8 0.6	46.92 .27	80.2 2.0	26.01 .10	52.6 0.7
29.3	40.52 .71	78.9 1.3	58.45 .12	35.4 0.6	46.64 .30	82.1 1.6	25.90 .11	53.3 0.7
May 9.3	39.79 .74	79.9 0.7	58.33 .12	36.1 0.7	46.33 .32	83.4 1.1	25.79 .12	54.0 0.7
19.3	39.04 .75	80.4 +0.2	58.21 .12	36.7 0.7	46.00 .33	84.3 0.6	25.67 .12	54.7 0.7
29.3	38.29 −.73	80.3 −0.3	58.09 −.11	37.4 +0.6	45.67 −.33	84.7 −0.1	25.56 −.11	55.4 +0.7
June 8.2	37.58 .68	79.7 0.9	57.99 .10	38.0 0.6	45.34 .32	84.6 +0.4	25.45 .10	56.0 0.6
18.2	36.93 .62	78.5 1.4	57.89 .09	38.6 0.5	45.02 .31	84.0 0.9	25.35 .09	56.6 0.5
28.2	36.35 .53	76.9 1.8	57.81 .07	39.1 0.5	44.72 .29	82.9 1.3	25.26 .08	57.1 0.4
July 8.1	35.87 .44	74.9 2.2	57.75 .05	39.5 0.4	44.44 .27	81.3 1.7	25.19 .06	57.4 0.3
18.1	35.48 −.33	72.4 −2.6	57.71 −.03	39.8 +0.3	44.19 −.23	79.4 +2.1	25.14 −.04	57.7 +0.2
28.1	35.21 .21	69.7 2.9	57.69 −.01	40.1 +0.2	43.99 .18	77.1 2.4	25.11 −.02	57.9 +0.1
Aug. 7.1	35.07 −.09	66.6 3.2	57.69 +.01	40.1 0.0	43.83 .13	74.5 2.7	25.09 .00	57.9 −0.1
17.0	35.04 +.04	63.3 3.3	57.72 .04	40.1 −0.1	43.73 −.07	71.7 2.8	25.10 +.02	57.8 0.2
27.0	35.14 .17	59.9 3.4	57.77 .07	39.9 0.3	43.70 .00	68.9 2.9	25.14 .05	57.5 0.4
Sept. 6.0	35.38 +.30	56.5 −3.5	57.86 +.10	39.5 −0.5	43.73 +.07	66.0 +2.8	25.21 +.08	57.0 −0.6
16.0	35.74 .43	53.0 3.5	57.97 .13	38.9 0.7	43.83 .14	63.3 2.6	25.31 .11	56.3 0.8
25.9	36.24 .56	49.5 3.3	58.12 .16	38.1 0.9	44.01 .21	60.7 2.4	25.44 .15	55.3 1.0
Oct. 5.9	36.85 .68	46.3 3.2	58.30 .20	37.0 1.2	44.26 .29	58.5 2.0	25.61 .19	54.2 1.3
15.9	37.59 .79	43.2 2.9	58.52 .23	35.7 1.4	44.58 .35	56.7 1.5	25.81 .22	52.8 1.5
25.8	38.44 +.89	40.4 −2.6	58.77 +.26	34.2 −1.6	44.97 +.41	55.5 +1.0	26.05 +.25	51.2 −1.7
Nov. 4.8	39.38 .98	38.0 2.2	59.05 .29	32.6 1.7	45.41 .46	54.8 +0.4	26.32 .28	49.5 1.8
14.8	40.40 1.05	36.0 1.7	59.35 .31	30.7 1.9	45.89 .50	54.7 −0.2	26.62 .31	47.6 1.9
24.7	41.48 1.09	34.5 1.2	59.68 .33	28.8 1.9	46.40 .51	55.2 0.9	26.94 .33	45.6 2.0
Dec. 4.7	42.59 1.11	33.6 0.7	60.01 .33	26.9 1.9	46.92 .51	56.4 1.5	27.27 .34	43.5 2.0
14.7	43.70+1.09	33.2 −0.1	60.34 +.33	24.9 −1.9	47.43 +.50	58.2 −2.0	27.61 +.33	41.6 −1.9
24.7	44.77 1.04	33.5 +0.5	60.67 .31	23.1 1.8	47.91 .47	60.5 2.5	27.94 .32	39.7 1.8
34.6	45.78+ .96	34.3 +1.1	60.97 +.29	21.4 −1.6	48.36 +.42	63.3 −3.0	28.26 +.30	38.0 −1.8

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*α Ursæ Majoris.*		*δ Leonis.*		*δ Crateris.*		*τ Leonis.*	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*
	h m 10 56	° ′ +62 20	h m 11 8	° ′ +21 7	h m 11 13	° ′ −14 10	h m 11 22	° ′ + 3 27
	s	″	s	″	s	″	s	″
(Dec. 30.7)	51.99 +.60	48.3 0.0	11.76 +.33	51.2 −1.5	47.13 +.32	32.5 −2.4	13.19 +.32	65.7 −2.0
Jan. 9.7	52.54 .53	48.6 +0.7	12.09 .31	49.8 1.2	47.43 .29	34.9 2.4	13.50 .29	63.7 1.9
19.6	53.05 .47	49.5 1.1	12.38 .27	48.8 0.8	47.70 .25	37.3 2.3	13.78 .26	61.9 1.7
29.6	53.48 .39	50.9 1.6	12.63 .23	48.1 0.5	47.94 .22	39.6 2.2	14.02 .23	60.4 1.4
Feb. 8.6	53.83 .30	52.7 2.0	12.85 .19	47.8 −0.1	48.13 .17	41.7 2.1	14.23 .18	59.1 1.2
18.5	54.09 +.21	54.9 +2.4	13.01 +.14	47.9 +0.2	48.28 +.13	43.7 −1.9	14.39 +.14	58.1 −0.9
28.5	54.25 .12	57.4 2.6	13.12 .09	48.2 0.5	48.39 .08	45.5 1.7	14.51 .09	57.3 0.6
Mar. 10.5	54.32 +.02	60.1 2.7	13.19 +.04	48.9 0.7	48.45 +.04	47.0 1.4	14.58 .05	56.8 0.4
20.5	54.30 −.06	62.8 2.7	13.21 .00	49.7 0.9	48.47 .00	48.3 1.2	14.62 +.02	56.6 −0.1
30.4	54.19 .14	65.4 2.6	13.19 −.04	50.7 1.0	48.45 −.03	49.3 0.9	14.61 −.02	56.6 +0.1
Apr. 9.4	54.01 −.21	67.9 +2.3	13.13 −.07	51.8 +1.1	48.40 −.06	50.1 −0.6	14.58 −.05	56.8 +0.3
19.4	53.77 .26	70.1 2.0	13.06 .09	52.9 1.1	48.33 .08	50.6 0.4	14.52 .07	57.1 0.4
29.3	53.48 .30	71.9 1.7	12.95 .11	54.0 1.1	48.24 .10	50.9 −0.2	14.44 .09	57.6 0.5
May 9.3	53.16 .33	73.4 1.2	12.84 .12	55.0 1.0	48.14 .11	51.0 0.0	14.35 .10	58.1 0.6
19.3	52.83 .34	74.4 0.8	12.72 .12	56.0 0.9	48.02 .11	50.9 +0.2	14.25 .10	58.7 0.6
29.3	52.49 −.33	75.0 +0.3	12.60 −.12	56.8 +0.7	47.91 −.12	50.5 +0.3	14.14 −.11	59.4 +0.7
June 8.2	52.16 .32	75.0 −0.2	12.48 .11	57.4 0.6	47.79 .11	50.0 0.6	14.03 .10	60.1 0.7
18.2	51.86 .29	74.6 0.7	12.37 .10	57.9 0.4	47.68 .11	49.3 0.8	13.93 .10	60.7 0.6
28.2	51.57 .26	73.7 1.1	12.27 .09	58.2 +0.2	47.57 .10	48.5 0.9	13.84 .09	61.3 0.6
July 8.2	51.33 .23	72.4 1.5	12.18 .08	58.3 0.0	47.48 .09	47.5 1.0	13.75 .08	62.0 0.6
18.1	51.12 −.18	70.6 −1.9	12.11 −.06	58.2 −0.2	47.40 −.08	46.4 +1.1	13.67 −.07	62.5 +0.5
28.1	50.96 .13	68.5 2.3	12.06 .04	57.9 0.4	47.33 .06	45.3 1.1	13.61 .06	63.0 0.4
Aug. 7.1	50.86 .08	66.1 2.6	12.02 −.02	57.4 0.6	47.28 .04	44.1 1.2	13.57 .03	63.3 0.3
17.0	50.81 −.02	63.4 2.8	12.01 .00	56.7 0.8	47.25 −.02	43.0 1.1	13.54 −.01	63.6 +0.2
27.0	50.82 +.04	60.4 3.0	12.02 +.03	55.8 1.0	47.25 +.01	41.9 1.0	13.54 +.01	63.7 0.0
Sept. 6.0	50.90 +.11	57.3 −3.2	12.07 +.06	54.7 −1.2	47.27 +.04	41.0 +0.9	13.56 +.04	63.6 −0.2
16.0	51.03 .17	54.0 3.3	12.14 .09	53.3 1.4	47.33 .08	40.2 0.6	13.62 .07	63.3 0.4
25.9	51.24 .24	50.7 3.3	12.26 .13	51.8 1.6	47.43 .12	39.7 0.4	13.71 .11	62.8 0.7
Oct. 5.9	51.51 .31	47.4 3.2	12.41 .17	50.1 1.8	47.57 .16	39.4 +0.1	13.84 .15	62.0 0.9
15.9	51.86 .38	44.2 3.1	12.59 .21	48.2 2.0	47.74 .20	39.5 −0.3	14.00 .19	60.9 1.2
25.9	52.27 +.44	41.2 −2.9	12.82 +.25	46.1 −2.1	47.96 +.23	40.0 −0.6	14.21 +.22	59.7 −1.4
Nov. 4.8	52.74 .50	38.4 2.7	13.09 .28	44.0 2.2	48.21 .27	40.7 1.0	14.45 .26	58.1 1.7
14.8	53.27 .55	35.9 2.3	13.38 .31	41.7 2.2	48.49 .30	41.9 1.3	14.73 .29	56.3 1.8
24.8	53.83 .58	33.7 1.9	13.71 .33	39.5 2.2	48.81 .32	43.4 1.6	15.03 .31	54.4 2.0
Dec. 4.7	54.43 .61	32.1 1.4	14.05 .35	37.4 2.1	49.14 .33	45.2 1.9	15.35 .33	52.3 2.1
14.7	55.05 +.61	30.9 −0.9	14.40 +.35	35.4 −1.9	49.47 +.33	47.3 −2.1	15.68 +.33	50.2 −2.1
24.7	55.66 .60	30.3 −0.3	14.75 .34	33.6 1.7	49.80 .32	49.5 2.3	16.02 .33	48.1 2.1
34.7	56.24 +.57	30.2 +0.2	15.09 +.33	32.0 −1.4	50.12 +.31	51.9 −2.4	16.34 +.31	46.0 −2.0

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	λ Draconis.		υ Leonis.		β Leonis.		γ Ursæ Majoris.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m	° ′	h m	° ′	h m	° ′	h m	° ′
	11 24	+69 56	11 31	− 0 12	11 43	+15 11	11 47	+54 18
	s	″	s	″	s	″	s	″
(Dec. 30.7)	47.78 +.76	23.9 −0.2	15.36 +.32	35.4 −2.1	23.16 +.33	32.3 −1.8	58.63 +.50	31.5 −0.9
Jan. 9.7	48.52 .72	24.1 +0.6	15.67 .30	37.5 2.0	23.48 .31	30.6 1.6	59.12 .47	30.9 −0.3
19.6	49.21 .65	24.9 1.1	15.96 .27	39.4 1.8	23.79 .28	29.2 1.3	59.57 .43	30.9 +0.3
29.6	49.82 .56	26.3 1.6	16.21 .23	41.1 1.6	24.06 .25	28.1 0.9	59.99 .39	31.5 0.8
Feb. 8.6	50.33 .46	28.2 2.1	16.42 .19	42.6 1.4	24.29 .21	27.3 0.6	60.35 .32	32.6 1.3
18.5	50.73 +.34	30.5 +2.5	16.59 +.15	43.9 −1.1	24.48 +.17	26.9 −0.2	60.64 +.26	34.1 +1.8
28.5	51.01 .21	33.1 2.7	16.71 .10	44.8 0.8	24.62 .12	26.8 +0.1	60.86 .18	36.1 2.1
Mar. 10.5	51.16 +.09	36.0 2.9	16.79 .06	45.6 0.6	24.72 .08	27.0 0.3	61.00 .11	38.3 2.4
20.5	51.18 −.03	38.9 2.9	16.84 +.02	46.0 0.3	24.77 +.04	27.5 0.6	61.08 +.04	40.8 2.5
30.4	51.09 .15	41.8 2.8	16.84 −.01	46.3 −0.1	24.79 .00	28.2 0.8	61.08 −.03	43.3 2.5
Apr. 9.4	50.89 −.25	44.6 +2.6	16.82 −.04	46.3 +0.1	24.77 −.03	29.0 +0.9	61.02 −.09	45.9 +2.5
19.4	50.60 .33	47.1 2.3	16.76 .06	46.1 0.2	24.73 .06	29.9 1.0	60.91 .14	48.3 2.3
29.4	50.24 .39	49.2 1.9	16.69 .08	45.8 0.4	24.66 .08	30.9 1.0	60.75 .18	50.5 2.1
May 9.3	49.81 .44	51.0 1.5	16.60 .09	45.4 0.5	24.57 .09	31.9 1.0	60.56 .21	52.4 1.8
19.3	49.35 .47	52.3 1.0	16.51 .10	44.9 0.5	24.47 .10	32.9 0.9	60.34 .23	54.0 1.4
29.3	48.87 −.48	53.1 +0.5	16.40 −.10	44.3 +0.6	24.36 −.11	33.8 +0.8	60.10 −.24	55.1 +1.0
June 8.3	48.38 .48	53.3 0.0	16.30 .10	43.7 0.6	24.25 .11	34.6 0.7	59.86 .24	55.9 0.5
18.2	47.91 .46	53.0 −0.5	16.20 .10	43.0 0.7	24.15 .11	35.2 0.6	59.62 .24	56.2 +0.1
28.2	47.46 .43	52.2 1.0	16.10 .09	42.3 0.7	24.04 .10	35.7 0.4	59.38 .23	56.0 −0.4
July 8.2	47.05 .39	51.0 1.5	16.01 .09	41.7 0.7	23.94 .09	36.1 0.3	59.16 .21	55.4 0.8
18.1	46.68 −.34	49.2 −2.0	15.93 −.08	41.0 +0.6	23.85 −.08	36.3 +0.1	58.96 −.19	54.4 −1.2
28.1	46.37 .27	47.0 2.4	15.86 .06	40.4 0.6	23.77 .07	36.3 −0.1	58.78 .16	53.0 1.6
Aug. 7.1	46.13 .20	44.5 2.7	15.80 .04	39.9 0.5	23.71 .05	36.2 0.3	58.64 .13	51.1 2.0
17.1	45.96 .13	41.6 3.0	15.77 −.02	39.5 0.4	23.66 .03	35.8 0.5	58.53 .09	48.9 2.3
27.0	45.87 −.05	38.4 3.3	15.76 .00	39.2 +0.2	23.64 −.01	35.2 0.7	58.46 −.05	46.4 2.6
Sept. 6.0	45.87 +.04	35.1 −3.4	15.77 +.03	39.1 0.0	23.65 +.02	34.4 −0.9	58.44 .00	43.7 −2.9
16.0	45.94 .13	31.6 3.5	15.82 .08	39.2 −0.2	23.69 .05	33.4 1.1	58.46 +.05	40.6 3.1
26.0	46.12 .22	28.0 3.6	15.90 .10	39.5 0.4	23.76 .09	32.2 1.4	58.54 .11	37.5 3.2
Oct. 5.9	46.39 .32	24.4 3.5	16.02 .14	40.0 0.7	23.86 .13	30.7 1.6	58.68 .17	34.2 3.3
15.9	46.75 .41	20.9 3.4	16.18 .18	40.9 1.0	24.01 .17	29.0 1.8	58.88 .23	30.9 3.3
25.9	47.21 +.50	17.5 −3.2	16.37 +.22	42.0 −1.3	24.20 +.21	27.1 −2.0	59.14 +.29	27.6 −3.2
Nov. 4.8	47.75 .59	14.4 3.0	16.61 .25	43.4 1.5	24.43 .25	25.0 2.1	59.46 .35	24.3 3.1
14.8	48.38 .66	11.6 2.6	16.88 .28	45.0 1.7	24.70 .28	22.8 2.2	59.83 .40	21.3 2.9
24.8	49.07 .72	9.2 2.2	17.18 .31	46.9 1.9	24.99 .31	20.6 2.3	60.26 .44	18.6 2.6
Dec. 4.8	49.82 .76	7.3 1.7	17.50 .32	48.9 2.0	25.32 .33	18.3 2.2	60.72 .48	16.2 2.2
14.7	50.60 +.78	5.9 −1.1	17.83 +.33	51.0 −2.1	25.65 +.34	16.1 −2.1	61.21 +.50	14.2 −1.7
24.7	51.38 .78	5.1 −0.5	18.16 .33	53.2 2.1	26.00 .34	14.1 2.0	61.71 .50	12.7 1.2
34.7	52.16 +.76	4.9 +0.1	18.48 +.32	55.3 −2.1	26.34 +.33	12.2 −1.7	62.22 +.49	11.8 −0.7

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*o* Virginis.		4 Draconis (H.)		γ Corvi.		β Chamæleontis.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *South.*
	h m 11 59	+ 9° 20′	h m 12 6	+78° 13′	h m 12 10	−16° 55′	h m 12 11	−78° 41′
	s	″	s	″	s	″	s	″
(Dec.30.7)	32.51 +.33	59.7 −1.9	58.65+1.22	45.3 −0.4	5.17 +.34	21.3 −2.2	51.89+1.18	18.1 −1.5
Jan. 9.6	32.83 .31	57.8 1.8	59.87 1.19	45.1 +0.2	5.50 .32	23.5 2.3	53.06 1.12	19.8 2.0
19.6	33.14 .29	56.1 1.5	61.03 1.12	45.6 0.8	5.81 .29	25.9 2.3	54.13 1.02	22.1 2.5
29.5	33.41 .26	54.7 1.3	62.10 1.01	46.8 1.4	6.09 .26	28.2 2.3	55.10 .89	24.9 2.9
Feb. 8.5	33.65 .22	53.6 1.0	63.04 .86	48.5 2.0	6.34 .22	30.4 2.2	55.92 .75	28.0 3.3
18.5	33.85 +.18	52.8 −0.6	63.82 +.69	50.7 +2.4	6.54 +.18	32.5 −2.0	56.59 +.59	31.4 −3.6
28.4	34.01 .14	52.4 −0.3	64.43 .50	53.4 2.8	6.70 .14	34.4 1.8	57.10 .42	35.1 3.7
Mar. 10.4	34.12 .10	52.2 0.0	64.83 .30	56.2 3.0	6.82 .10	36.1 1.6	57.44 .25	38.9 3.8
20.4	34.19 .05	52.3 +0.2	65.03 +.10	59.3 3.1	6.90 .06	37.6 1.4	57.60 +.08	42.7 3.8
30.4	34.22 +.02	52.7 0.4	65.03 −.10	62.4 3.1	6.94 +.03	38.8 1.1	57.60 −.08	46.5 3.7
Apr. 9.3	34.22 −.01	53.2 +0.6	64.83 −.29	65.4 +2.9	6.95 .00	39.8 −0.9	57.44 −.25	50.2 −3.6
19.3	34.19 .04	53.9 0.7	64.45 .45	68.2 2.7	6.93 −.03	40.6 0.7	57.12 .39	53.6 3.3
29.3	34.14 .06	54.7 0.8	63.93 .60	70.7 2.3	6.89 .06	41.1 0.5	56.66 .53	56.8 3.0
May 9.3	34.07 .08	55.5 0.8	63.27 .71	72.9 1.9	6.82 .07	41.5 −0.2	56.07 .65	59.6 2.6
19.2	33.98 .09	56.3 0.8	62.51 .79	74.6 1.4	6.74 .09	41.6 0.0	55.36 .75	62.0 2.2
29.2	33.89 −.10	57.1 +0.8	61.68 −.86	75.7 +0.9	6.65 −.10	41.5 +0.2	54.56 −.84	64.1 −1.8
June 8.2	33.79 .10	57.9 0.7	60.80 .89	76.3 +0.4	6.55 .11	41.3 0.3	53.68 .91	65.6 1.2
18.1	33.68 .10	58.6 0.7	59.90 .89	76.4 −0.2	6.44 .11	40.9 0.5	52.74 .96	66.5 0.7
28.1	33.58 .10	59.2 0.6	59.02 .87	76.0 0.7	6.33 .11	40.3 0.7	51.77 .98	67.0 −0.2
July 8.1	33.48 .10	59.7 0.5	58.17 .83	74.9 1.3	6.21 .11	39.5 0.8	50.78 .97	66.8 +0.4
18.1	33.39 −.09	60.1 +0.3	57.37 −.77	73.4 −1.8	6.10 −.11	38.7 +0.9	49.82 −.94	66.2 +0.9
28.0	33.30 .08	60.4 +0.2	56.64 .68	71.4 2.2	6.00 .10	37.7 1.0	48.90 .87	65.0 1.5
Aug. 7.0	33.23 .07	60.5 0.0	56.01 .58	69.0 2.6	5.91 .08	36.6 1.0	48.07 .78	63.3 1.9
17.0	33.17 .05	60.4 −0.2	55.49 .46	66.1 3.0	5.83 .07	35.6 1.0	47.34 .66	61.2 2.3
27.0	33.14 −.02	60.2 0.4	55.08 .34	63.0 3.3	5.78 .05	34.6 1.0	46.74 .51	58.7 2.7
Sept. 5.9	33.13 .00	59.7 −0.6	54.81 −.20	59.5 −3.5	5.75 −.02	33.6 +0.9	46.31 −.34	55.9 +2.9
15.9	33.15 +.03	59.0 0.8	54.69 −.05	55.9 3.7	5.75 +.02	32.8 0.8	46.06 −.15	52.9 3.0
25.9	33.20 .07	58.1 1.0	54.71 +.11	52.1 3.8	5.79 .06	32.1 0.6	46.01 +.05	49.9 3.0
Oct. 5.8	33.29 .11	57.0 1.3	54.90 .27	48.3 3.8	5.87 .10	31.6 +0.3	46.17 .26	46.9 2.9
15.8	33.42 .15	55.6 1.5	55.26 .43	44.5 3.7	5.99 .15	31.5 0.0	46.54 .47	44.1 2.7
25.8	33.59 +.19	54.0 −1.7	55.77 +.59	40.8 −3.6	6.16 +.19	31.6 −0.3	47.11 +.66	41.5 +2.4
Nov. 4.8	33.81 .23	52.1 1.9	56.44 .75	37.3 3.3	6.37 .23	32.2 0.6	47.87 .84	39.4 1.9
14.7	34.06 .27	50.1 2.1	57.27 .89	34.2 3.0	6.63 .27	33.0 1.0	48.79 .99	37.7 1.4
24.7	34.34 .30	48.0 2.2	58.23 1.02	31.4 2.6	6.92 .30	34.2 1.4	49.85 1.11	36.6 0.8
Dec. 4.7	34.65 .32	45.8 2.2	59.31 1.12	29.0 2.1	7.23 .33	35.8 1.7	51.01 1.18	36.1 +0.1
14.7	34.99 +.33	43.6 −2.2	60.47+1.19	27.2 −1.5	7.57 +.34	37.6 −1.0	52.22+1.22	36.2 −0.4
24.6	35.32 .34	41.4 2.1	61.68 1.22	26.0 0.9	7.91 .34	39.6 2.1	53.44 1.22	37.0 1.1
34.6	35.66 +.33	39.4 −2.0	62.91+1.22	25.5 −0.2	8.25 +.34	41.8 −2.2	54.64+1.20	38.4 −1.7

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	η Virginis.		α^1 Crucis.		β Corvi.		κ Draconis.	
	Right Ascension.	Declination *South.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*
	h m 12 14	° ′ − 0 2	h m 12 20	° ′ −62 28	h m 12 28	° ′ −22 46	h m 12 28	° ′ +70 23
	s	″	s	″	s	″	s	″
(Dec.30.7)	12.81 +.33	54.8 −2.1	25.42 +.58	37.8 −1.7	32.59 +.35	45.1 −2.1	43.26 +.78	47.3 −1.0
Jan. 9.7	13.13 .31	56.9 2.0	25.98 .55	39.7 2.2	32.94 .33	47.3 2.3	44.03 .77	46.7 −0.3
19.7	13.44 .29	58.9 1.9	26.51 .50	42.1 2.6	33.26 .31	49.6 2.4	44.79 .73	46.7 +0.3
29.7	13.72 .26	60.7 1.7	26.99 .45	44.9 3.0	33.56 .28	52.0 2.4	45.50 .67	47.3 0.9
Feb. 8.6	13.96 .23	62.2 1.4	27.40 .38	48.0 3.2	33.82 .24	54.4 2.3	46.14 .59	48.5 1.5
18.6	14.17 +.19	63.5 −1.1	27.75 +.31	51.4 −3.4	34.05 +.20	56.6 −2.2	46.68 +.49	50.3 +2.0
28.6	14.34 .14	64.5 0.9	28.02 .24	54.8 3.5	34.23 .16	58.8 2.1	47.13 .38	52.6 2.4
Mar. 10.5	14.46 .10	65.3 0.6	28.22 .16	58.4 3.5	34.37 .12	60.8 1.9	47.45 .26	55.2 2.7
20.5	14.55 .07	65.7 0.3	28.34 .09	61.9 3.5	34.48 .08	62.6 1.7	47.65 .14	58.1 2.9
30.5	14.60 +.03	66.0 −0.1	28.40 +.02	65.3 3.4	34.54 .05	64.2 1.5	47.73 +.02	61.1 3.0
Apr. 9.5	14.61 .00	66.0 +0.2	28.38 −.05	68.6 −3.2	34.57 +.01	65.6 −1.3	47.69 −.09	64.1 +2.9
19.4	14.60 −.03	65.8 0.4	28.30 .10	71.6 2.9	34.56 −.01	66.7 1.0	47.54 .20	67.0 2.8
29.4	14.56 .05	65.5 0.5	28.16 .16	74.3 2.6	34.54 .04	67.6 0.8	47.29 .29	69.6 2.5
May 9.4	14.50 .06	65.0 0.6	27.97 .21	76.7 2.2	34.48 .06	68.3 0.6	46.96 .36	72.0 2.2
19.4	14.43 .08	64.5 0.6	27.74 .26	78.7 1.8	34.41 .08	68.7 0.3	46.57 .42	73.9 1.7
29.3	14.34 −.09	63.9 +0.7	27.46 −.29	80.3 −1.4	34.32 −.10	68.9 −0.1	46.12 −.46	75.5 +1.3
June 8.3	14.25 .10	63.3 0.6	27.15 .32	81.5 0.9	34.22 .11	68.9 +0.1	45.64 .49	76.5 0.8
18.3	14.15 .10	62.6 0.6	26.82 .34	82.2 −0.4	34.11 .12	68.7 0.3	45.14 .50	77.0 +0.3
28.2	14.05 .10	62.0 0.6	26.47 .35	82.3 0.0	33.99 .12	68.2 0.5	44.63 .50	77.0 −0.3
July 8.2	13.95 .10	61.3 0.6	26.12 .35	82.0 +0.5	33.87 .12	67.6 0.7	44.13 .49	76.4 0.8
18.2	13.85 −.10	60.7 +0.6	25.77 −.35	81.2 +1.0	33.75 −.12	66.8 +0.9	43.65 −.46	75.4 −1.3
28.2	13.76 .09	60.2 0.5	25.43 .32	80.0 1.5	33.63 .12	65.8 1.1	43.20 .42	73.8 1.8
Aug. 7.1	13.68 .08	59.7 0.4	25.12 .29	78.3 1.8	33.52 .11	64.7 1.2	42.80 .37	71.8 2.3
17.1	13.61 .06	59.4 0.3	24.84 .25	76.3 2.1	33.42 .09	63.5 1.2	42.46 .31	69.3 2.7
27.1	13.56 .04	59.2 +0.1	24.62 .19	74.0 2.4	33.34 .07	62.3 1.2	42.17 .24	66.5 3.0
Sept. 6.1	13.53 −.01	59.1 0.0	24.46 −.12	71.4 +2.6	33.29 −.04	61.1 +1.2	41.97 −.17	63.3 −3.3
16.0	13.54 +.02	59.2 −0.2	24.37 −.04	68.7 2.7	33.27 .00	60.0 1.1	41.84 −.08	59.9 3.5
26.0	13.58 .05	59.6 0.5	24.37 +.04	66.0 2.7	33.29 +.04	59.0 0.9	41.81 +.01	56.3 3.7
Oct. 6.0	13.65 .10	60.1 0.7	24.45 .13	63.4 2.5	33.36 .08	58.2 0.7	41.87 .11	52.5 3.8
16.0	13.77 .14	61.0 1.0	24.63 .22	60.9 2.3	33.46 .13	57.6 +0.4	42.04 .22	48.8 3.8
25.9	13.93 +.18	62.1 −1.3	24.89 +.31	58.8 +1.9	33.62 +.18	57.5 0.0	42.31 +.32	45.0 −3.7
Nov. 4.9	14.13 .22	63.5 1.5	25.24 .39	57.1 1.5	33.82 .22	57.6 −0.3	42.69 .43	41.4 3.6
14.9	14.37 .26	65.1 1.7	25.67 .46	55.9 1.0	34.07 .27	58.1 0.7	43.16 .52	38.0 3.3
24.8	14.65 .29	67.0 1.9	26.16 .52	55.2 +0.4	34.36 .30	59.0 1.1	43.73 .61	34.9 2.9
Dec. 4.8	14.95 .31	69.0 2.1	26.71 .57	55.1 −0.2	34.67 .33	60.2 1.4	44.39 .69	32.1 2.5
14.8	15.27 +.33	71.1 −2.2	27.28 +.58	55.6 −0.8	35.01 +.34	61.8 −1.7	45.11 +.74	29.9 −2.0
24.8	15.60 .33	73.3 2.2	27.87 .58	56.6 1.3	35.36 .35	63.7 2.0	45.87 .77	28.2 1.4
34.7	15.94 +.33	75.4 −2.2	28.45 +.57	58.3 −1.8	35.71 +.35	65.8 −2.2	46.65 +.78	27.2 −0.8

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	32ˢ Camelop. (H.)		*a* Can. Venaticorum.		*θ* Virginis.		*a* Virginis. (*Spica.*)	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *South.*
	h m 12 48	° ′ +84 0	h m 12 50	° ′ +38 54	h m 13 4	° ′ − 4 56	h m 13 19	° ′ −10 34
	s	″	s	″	s	″	s	″
(Dec. 30.7)	15.92+2.24	44.8 −0.8	48.96 +.39	57.4 −1.8	11.04 +.33	39.2 −2.1	19.52 +.33	45.0 −2.0
Jan. 9.7	18.17 2.25	44.3 −0.2	49.35 .39	55.8 1.4	11.37 .33	41.3 2.1	19.86 .33	47.0 2.0
19.7	20.41 2.20	44.4 +0.4	49.73 .37	54.7 0.9	11.69 .31	43.4 2.0	20.18 .32	49.1 2.0
29.7	22.55 2.06	45.1 1.0	50.09 .35	54.0 −0.4	12.00 .29	45.3 1.9	20.49 .30	51.1 1.9
Feb. 8.6	24.52 1.85	46.5 1.7	50.42 .31	53.9 +0.1	12.27 .26	47.0 1.7	20.78 .27	53.0 1.8
18.6	26.24+1.57	48.5 +2.2	50.71 +.27	54.4 +0.7	12.52 +.23	48.6 −1.4	21.04 +.24	54.7 −1.6
28.6	27.66 1.25	50.9 2.6	50.96 .22	55.3 1.1	12.73 .19	49.8 1.2	21.26 .21	56.2 1.4
Mar. 10.6	28.73 .89	53.6 2.9	51.15 .17	56.6 1.5	12.90 .16	50.9 0.9	21.45 .17	57.5 1.2
20.5	29.42 .49	56.7 3.1	51.29 .12	58.3 1.8	13.04 .12	51.6 0.7	21.60 .13	58.6 1.0
30.5	29.72+ .10	59.8 3.1	51.38 .07	60.2 2.0	13.14 .08	52.2 0.4	21.71 .10	59.4 0.7
Apr. 9.5	29.63− .28	62.9 +3.1	51.43 +.02	62.3 +2.1	13.20 +.05	52.4 −0.2	21.80 +.07	60.1 −0.5
19.4	29.17 .63	65.9 2.9	51.43 −.02	64.5 2.2	13.24 +.02	52.5 0.0	21.85 .04	60.5 0.3
29.4	28.36 .96	68.6 2.6	51.39 .05	66.7 2.1	13.25 .00	52.4 +0.2	21.87 +.01	60.7 −0.1
May 9.4	27.25 1.26	71.1 2.2	51.32 .09	68.7 2.0	13.23 −.03	52.2 0.3	21.87 −.02	60.8 0.0
19.4	25.87 1.49	73.1 1.8	51.22 .11	70.6 1.8	13.19 .05	51.9 0.4	21.85 .04	60.7 +0.1
29.3	24.28−1.67	74.6 +1.3	51.10 −.13	72.3 +1.5	13.14 −.06	51.4 +0.5	21.80 −.05	60.5 +0.2
June 8.3	22.54 1.79	75.6 0.8	50.96 .15	73.7 1.2	13.06 .08	50.9 0.5	21.74 .07	60.2 0.3
18.3	20.71 1.87	76.1 +0.2	50.81 .16	74.7 0.9	12.98 .09	50.4 0.6	21.66 .09	59.8 0.4
28.3	18.82 1.89	76.0 −0.4	50.65 .16	75.4 0.5	12.88 .10	49.8 0.6	21.56 .10	59.3 0.5
July 8.2	16.94 1.86	75.4 0.9	50.48 .16	75.7 +0.1	12.78 .11	49.2 0.6	21.46 .11	58.8 0.6
18.2	15.11−1.79	74.2 −1.4	50.32 −.16	75.6 −0.3	12.67 −.11	48.6 +0.6	21.34 −.12	58.2 +0.6
28.2	13.37 1.67	72.5 1.9	50.16 .15	75.2 0.6	12.56 .11	48.0 0.6	21.22 .12	57.6 0.6
Aug. 7.1	11.77 1.52	70.3 2.4	50.01 .14	74.4 1.0	12.45 .11	47.5 0.5	21.11 .12	57.0 0.6
17.1	10.34 1.33	67.7 2.8	49.88 .13	73.1 1.4	12.35 .10	47.0 0.4	20.99 .11	56.4 0.6
27.1	9.12 1.11	64.7 3.2	49.77 .10	71.6 1.7	12.26 .08	46.6 0.3	20.89 .09	55.8 0.5
Sept. 6.1	8.13− .86	61.4 −3.4	49.68 −.07	69.7 −2.0	12.19 −.06	46.3 +0.2	20.81 −.07	55.3 +0.5
16.0	7.41 .59	57.8 3.7	49.63 −.03	67.5 2.3	12.14 −.03	46.2 0.0	20.75 .04	54.9 0.3
26.0	6.97− .29	54.1 3.8	49.61 +.01	65.1 2.6	12.13 .00	46.3 −0.2	20.72 −.01	54.6 +0.1
Oct. 6.0	6.83+ .02	50.2 3.9	49.64 .05	62.3 2.8	12.16 +.04	46.5 0.4	20.73 +.03	54.6 −0.1
16.0	7.02 .35	46.3 3.9	49.72 .11	59.4 3.0	12.22 .08	47.1 0.6	20.79 .07	54.7 0.3
25.9	7.53+ .68	42.4 −3.8	49.85 +.15	56.3 −3.1	12.34 +.13	47.9 −0.9	20.88 +.12	55.2 −0.6
Nov. 4.9	8.37 1.00	38.8 3.6	50.03 .21	53.2 3.2	12.50 .18	48.9 1.2	21.03 .17	55.8 0.8
14.9	9.53 1.31	35.3 3.3	50.27 .26	50.0 3.1	12.70 .22	50.2 1.5	21.22 .21	56.8 1.1
24.8	10.99 1.60	32.2 2.9	50.55 .31	47.0 3.0	12.94 .26	51.8 1.7	21.46 .25	58.1 1.4
Dec. 4.8	12.72 1.85	29.5 2.4	50.88 .34	44.0 2.8	13.22 .29	53.6 1.9	21.73 .29	59.6 1.6
14.8	14.68+2.05	27.3 −1.9	51.24 +.37	41.3 −2.5	13.53 +.32	55.6 −2.0	22.04 +.31	61.4 −1.8
24.8	16.81 2.18	25.7 1.3	51.62 .39	39.0 2.1	13.85 .33	57.7 2.1	22.36 .33	63.3 2.0
34.7	19.04+2.23	24.7 −0.6	52.02 +.39	37.0 −1.7	14.19 +.33	59.8 −2.1	22.70 +.34	65.3 −2.0

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Virginis.		η Ursæ Majoris.		η Bootis.		β Centauri.	
	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*
	h m	° ′	h m	° ′	h m	° ′	h m	° ′
	13 29	− 0 1	13 43	+49 51	13 49	+18 56	13 55	−59 49
	s	″	s	″	s	″	s	″
(Dec. 30.8)	0.96 +.32	35.6 −2.1	8.43 +.43	53.9 −2.3	22.57 +.33	75.5 −2.3	57.66 +.55	50.5 −0.5
Jan. 9.8	1.29 .33	37.7 2.1	8.86 .44	51.9 1.7	22.90 .33	73.3 2.1	58.22 .56	51.3 1.0
19.7	1.61 .32	39.7 1.9	9.31 .44	50.5 1.2	23.24 .33	71.3 1.7	58.78 .55	52.5 1.5
29.7	1.92 .30	41.5 1.7	9.74 .42	49.7 −0.5	23.56 .32	69.8 1.4	59.32 .53	54.2 1.9
Feb. 8.7	2.21 .28	43.1 1.5	10.15 .40	49.4 +0.1	23.87 .30	68.6 0.9	59.84 .50	56.3 2.2
18.7	2.47 +.24	44.4 −1.2	10.53 +.36	49.8 +0.7	24.16 +.27	67.9 −0.5	60.32 +.45	58.7 −2.6
28.6	2.70 .21	45.5 0.9	10.87 .31	50.8 1.2	24.41 .24	67.6 −0.1	60.74 .40	61.4 2.8
Mar. 10.6	2.89 .18	46.2 0.6	11.16 .26	52.2 1.7	24.63 .20	67.7 +0.3	61.12 .35	64.3 2.9
20.6	3.05 .14	46.7 0.3	11.39 .20	54.1 2.1	24.81 .16	68.2 0.7	61.44 .29	67.3 3.0
30.5	3.17 .11	46.9 −0.1	11.56 .14	56.4 2.4	24.96 .13	69.1 1.0	61.70 .23	70.3 3.1
Apr. 9.5	3.26 +.07	46.9 +0.1	11.67 +.09	58.9 +2.6	25.07 +.09	70.2 +1.2	61.89 +.17	73.4 −3.0
19.5	3.32 .04	46.7 0.3	11.73 +.03	61.6 2.7	25.14 .06	71.5 1.4	62.03 .11	76.4 2.9
29.5	3.35 +.02	46.3 0.4	11.74 −.02	64.2 2.7	25.18 +.03	73.0 1.5	62.10 +.05	79.2 2.8
May 9.4	3.36 −.01	45.8 0.6	11.70 .06	66.9 2.6	25.19 .00	74.5 1.5	62.12 −.01	81.9 2.6
19.4	3.34 .03	45.2 0.6	11.61 .11	69.3 2.3	25.18 −.03	76.0 1.5	62.08 .07	84.4 2.3
29.4	3.30 −.05	44.5 +0.7	11.48 −.14	71.5 +2.1	25.14 −.05	77.5 +1.4	61.99 −.12	86.6 −2.0
June 8.3	3.24 .07	43.8 0.7	11.33 .17	73.4 1.7	25.08 .07	78.9 1.3	61.85 .17	88.5 1.7
18.3	3.16 .08	43.1 0.7	11.14 .20	75.0 1.3	25.00 .09	80.1 1.1	61.65 .22	90.1 1.4
28.3	3.07 .10	42.4 0.7	10.93 .22	76.1 0.9	24.90 .11	81.1 0.9	61.41 .26	91.2 1.0
July 8.3	2.97 .11	41.8 0.6	10.71 .23	76.8 +0.5	24.79 .12	81.9 0.7	61.14 .29	92.0 0.5
18.2	2.86 −.11	41.2 +0.5	10.48 −.24	77.0 0.0	24.66 −.13	82.4 +0.5	60.84 −.31	92.3 −0.1
28.2	2.74 .12	40.7 0.5	10.24 .24	76.8 −0.5	24.53 .14	82.8 +0.2	60.52 .32	92.1 +0.4
Aug. 7.2	2.62 .12	40.3 0.4	10.00 .23	76.1 0.9	24.39 .14	82.8 −0.1	60.19 .33	91.6 0.8
17.2	2.51 .11	40.0 0.3	9.77 .22	74.9 1.4	24.26 .13	82.6 0.3	59.87 .31	90.5 1.2
27.1	2.41 .10	39.8 +0.1	9.57 .20	73.3 1.8	24.13 .12	82.1 0.6	59.56 .29	89.1 1.6
Sept. 6.1	2.32 −.08	39.8 −0.1	9.38 −.17	71.4 −2.2	24.02 −.10	81.3 −0.9	59.29 −.25	87.4 +1.9
16.1	2.25 .05	39.9 0.2	9.23 .13	69.0 2.6	23.93 .06	80.3 1.2	59.07 .19	85.3 2.2
26.0	2.22 −.02	40.3 0.4	9.11 .09	66.2 2.9	23.87 .04	78.9 1.5	58.90 .13	83.0 2.4
Oct. 6.0	2.22 +.02	40.8 0.7	9.05 −.04	63.2 3.2	23.84 −.01	77.3 1.8	58.81 −.05	80.7 2.4
16.0	2.26 .06	41.7 0.9	9.04 +.02	59.9 3.4	23.85 +.03	75.4 2.0	58.81 +.04	78.3 2.3
26.0	2.34 +.11	42.7 −1.2	9.09 +.09	56.5 −3.5	23.91 +.08	73.3 −2.3	58.89 +.13	76.0 +2.2
Nov. 4.9	2.48 .16	44.0 1.4	9.21 .15	52.9 3.6	24.02 .13	70.9 2.4	59.06 .22	73.9 2.0
14.9	2.66 .20	45.6 1.7	9.39 .21	49.3 3.6	24.17 .18	68.4 2.6	59.32 .31	72.0 1.7
24.9	2.88 .24	47.3 1.9	9.64 .28	45.7 3.5	24.38 .23	65.8 2.7	59.67 .38	70.6 1.3
Dec. 4.8	3.14 .28	49.3 2.0	9.94 .33	42.4 3.3	24.62 .27	63.1 2.7	60.09 .45	69.5 0.8
14.8	3.43 +.30	51.4 −2.1	10.30 +.38	39.2 −3.0	24.91 +.30	60.4 −2.6	60.57 +.51	69.0 +0.3
24.8	3.75 .32	53.5 2.2	10.70 .41	36.4 2.6	25.22 .32	57.8 2.5	61.10 .54	68.9 −0.2
34.8	4.07 +.32	55.7 −2.1	11.13 +.43	34.1 −2.1	25.55 +.33	55.4 −2.3	61.65 +.56	69.4 −0.8

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*α* Draconis.		*α* Bootis. (*Arcturus.*)		*θ* Bootis.		*ρ* Bootis.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	$14^h\ 1^m$	$+64^\circ\ 53'$	$14^h\ 10^m$	$+19^\circ\ 45'$	$14^h\ 21^m$	$+52^\circ\ 21'$	$14^h\ 27^m$	$+30^\circ\ 51'$
	s	″	s	″	s	″	s	″
(Dec. 30.8)	20.98 +.57	72.5 −2.3	34.40 +.32	37.6 −2.4	23.25 +.42	42.2 −2.6	1.18 +.32	28.7 −2.6
Jan. 9.8	21.56 .60	70.5 1.7	34.72 .33	35.3 2.2	23.68 .44	39.8 2.1	1.52 .34	26.3 2.2
19.8	22.18 .61	69.1 1.0	35.05 .33	33.2 1.9	24.12 .45	38.0 1.5	1.87 .35	24.2 1.8
29.7	22.79 .60	68.4 −0.4	35.38 .32	31.6 1.5	24.58 .45	36.7 0.9	2.22 .34	22.6 1.3
Feb. 8.7	23.38 .58	68.4 +0.3	35.70 .30	30.3 1.1	25.02 .43	36.2 −0.3	2.56 .33	21.5 0.8
18.7	23.94 +.53	69.0 +0.9	35.99 +.28	29.4 −0.6	25.44 +.40	36.2 +0.3	2.88 +.31	21.0 −0.2
28.7	24.44 .47	70.2 1.5	36.25 .25	29.0 −0.2	25.82 .36	36.9 0.9	3.18 .28	21.0 +0.3
Mar. 10.6	24.87 .39	72.0 2.0	36.49 .22	29.1 +0.2	26.16 .31	38.1 1.5	3.44 .25	21.4 0.7
20.6	25.23 .31	74.2 2.4	36.69 .18	29.5 0.6	26.45 .26	39.8 2.0	3.67 .21	22.4 1.1
30.6	25.50 .22	76.8 2.7	36.85 .15	30.4 1.0	26.68 .20	42.0 2.3	3.86 .17	23.7 1.5
Apr. 9.5	25.67 +.13	79.7 +2.9	36.98 +.11	31.4 +1.2	26.85 +.14	44.5 +2.6	4.01 +.13	25.4 +1.8
19.5	25.76 +.05	82.7 3.0	37.07 .08	32.8 1.4	26.97 .09	47.2 2.8	4.12 .10	27.3 2.0
29.5	25.77 −.04	85.7 3.0	37.13 .05	34.3 1.5	27.02 +.03	50.0 2.8	4.20 .06	29.4 2.1
May 9.5	25.69 .12	88.6 2.8	37.16 +.02	35.8 1.6	27.03 −.02	52.8 2.8	4.24 +.02	31.6 2.2
19.4	25.54 .19	91.3 2.6	37.16 −.01	37.4 1.6	26.98 .07	55.5 2.6	4.24 −.01	33.7 2.1
29.4	25.32 −.25	93.8 +2.3	37.14 −.04	39.0 +1.5	26.88 −.12	58.0 +2.4	4.22 −.04	35.8 +2.0
June 8.4	25.04 .30	95.9 1.9	37.09 .06	40.4 1.4	26.74 .16	60.2 2.1	4.16 .07	37.7 1.8
18.4	24.71 .35	97.6 1.5	37.01 .08	41.7 1.2	26.56 .19	62.2 1.7	4.08 .10	39.4 1.6
28.3	24.35 .38	98.8 1.0	36.92 .10	42.8 1.0	26.36 .22	63.7 1.3	3.97 .12	40.8 1.3
July 8.3	23.95 .40	99.6 +0.5	36.80 .12	43.6 0.8	26.12 .25	64.7 0.9	3.84 .14	42.0 1.0
18.3	23.54 −.42	99.8 0.0	36.68 −.13	44.3 +0.5	25.87 −.26	65.4 +0.4	3.69 −.16	42.8 +0.6
28.2	23.12 .42	99.4 −0.6	36.54 .14	44.7 +0.2	25.60 .27	65.5 −0.1	3.53 .17	43.2 +0.3
Aug. 7.2	22.70 .41	98.6 1.1	36.39 .15	44.8 0.0	25.32 .28	65.2 0.6	3.36 .17	43.3 −0.1
17.2	22.29 .40	97.3 1.6	36.25 .14	44.6 −0.3	25.05 .27	64.4 1.1	3.18 .17	43.1 0.4
27.2	21.91 .37	95.5 2.1	36.11 .14	44.1 0.6	24.78 .26	63.1 1.5	3.01 .16	42.4 0.8
Sept. 6.1	21.56 −.32	93.2 −2.5	35.98 −.12	43.3 −0.9	24.53 −.23	61.3 −2.0	2.85 −.15	41.4 −1.2
16.1	21.26 .27	90.5 2.9	35.86 .10	42.3 1.2	24.32 .20	59.1 2.4	2.71 .13	40.0 1.6
26.1	21.01 .21	87.5 3.2	35.78 .07	40.9 1.5	24.13 .16	56.6 2.7	2.60 .10	38.3 1.9
Oct. 6.1	20.84 .14	84.1 3.5	35.73 −.03	39.2 1.8	24.00 .11	53.7 3.1	2.52 .06	36.2 2.2
16.0	20.74 −.05	80.5 3.7	35.71 +.01	37.3 2.1	23.92 −.06	50.4 3.4	2.48 −.02	33.8 2.5
26.0	20.73 +.04	76.7 −3.8	35.75 +.06	35.1 −2.3	23.90 +.01	47.0 −3.5	2.48 +.03	31.2 −2.8
Nov. 5.0	20.82 .13	72.9 3.9	35.83 .11	32.7 2.5	23.95 .08	43.3 3.7	2.54 .09	28.3 3.0
14.9	21.00 .22	69.0 3.8	35.96 .16	30.1 2.7	24.07 .15	39.6 3.7	2.66 .14	25.2 3.1
24.9	21.27 .32	65.3 3.7	36.14 .20	27.3 2.8	24.26 .23	35.9 3.7	2.82 .19	22.1 3.1
Dec. 4.9	21.63 .40	61.7 3.4	36.37 .25	24.5 2.8	24.52 .29	32.3 3.5	3.04 .24	19.0 3.1
14.9	22.08 +.48	58.4 −3.1	36.64 +.28	21.8 −2.7	24.84 +.35	28.9 −3.3	3.30 +.28	15.9 −3.0
24.8	22.59 .54	55.6 2.6	36.93 .31	19.1 2.6	25.21 .39	25.8 2.9	3.60 .31	13.0 2.8
34.8	23.16 +.58	53.2 −2.1	37.25 +.33	16.5 −2.5	25.62 +.42	23.1 −2.5	3.93 +.34	10.3 −2.5

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	5 Ursæ Minoris.		α² Centauri.		ε Bootis.		α² Libræ.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*
	h m 14 27	° ′ +76 10	h m 14 32	° ′ −60 22	h m 14 40	° ′ +27 32	h m 14 44	° ′ −15 34
	s	″	s	″	s	″	s	″
(Dec. 30.8)	42.58 +.86	71.2 −2.4	2.64 +.53	25.1 0.0	6.72 +.31	30.6 −2.6	42.53 +.31	37.9 −1.5
Jan. 9.8	43.49 .94	69.1 1.8	3.19 .55	25.3 −0.5	7.05 .33	28.2 2.3	42.86 .33	39.5 1.6
19.8	44.47 .99	67.6 1.2	3.75 .56	26.1 1.0	7.39 .34	26.0 1.9	43.19 .33	41.2 1.7
29.7	45.47 1.01	66.8 −0.5	4.30 .55	27.3 1.4	7.73 .34	24.3 1.5	43.52 .32	42.8 1.7
Feb. 8.7	46.47 .98	66.6 +0.2	4.84 .53	28.9 1.8	8.06 .33	23.1 1.0	43.84 .31	44.5 1.6
18.7	47.44 +.93	67.2 +0.8	5.36 +.49	30.9 −2.1	8.38 +.31	22.3 −0.5	44.14 +.30	46.1 −1.5
28.7	48.33 .84	68.3 1.4	5.83 .45	33.1 2.4	8.67 .28	22.1 0.0	44.43 .28	47.5 1.4
Mar. 10.6	49.11 .73	70.1 1.8	6.26 .40	35.6 2.6	8.94 .25	22.4 +0.5	44.69 .24	48.8 1.2
20.6	49.78 .59	72.3 2.4	6.63 .35	38.3 2.8	9.17 .21	23.1 0.9	44.92 .22	49.9 1.0
30.6	50.30 .44	74.9 2.8	6.95 .29	41.1 2.8	9.37 .18	24.3 1.3	45.12 .19	50.9 0.8
Apr. 9.6	50.66 +.26	77.8 +3.0	7.21 +.23	44.0 −2.9	9.53 +.15	25.8 +1.6	45.29 +.16	51.6 −0.7
19.5	50.87 +.12	80.9 3.1	7.42 .17	46.9 2.9	9.66 .11	27.6 1.9	45.43 .13	52.2 0.5
29.5	50.91 −.04	84.0 3.1	7.56 .11	49.7 2.8	9.75 .07	29.5 2.0	45.54 .10	52.6 0.4
May 9.5	50.79 .19	87.1 3.0	7.64 +.05	52.4 2.7	9.81 .04	31.6 2.1	45.63 .07	52.9 0.2
19.4	50.53 .33	90.0 2.8	7.66 −.01	55.0 2.5	9.83 +.01	33.6 2.0	45.68 .04	53.1 −0.1
29.4	50.13 −.46	92.6 +2.5	7.62 −.07	57.3 −2.2	9.82 −.02	35.6 +1.9	45.71 +.01	53.1 0.0
June 8.4	49.62 .57	94.9 2.1	7.52 .13	59.5 2.0	9.78 .05	37.5 1.8	45.70 −.01	53.1 +0.1
18.4	49.00 .66	96.7 1.6	7.36 .18	61.3 1.7	9.71 .08	39.2 1.6	45.67 .04	53.0 0.2
28.3	48.29 .74	98.1 1.2	7.15 .23	62.8 1.3	9.62 .11	40.7 1.3	45.62 .07	52.8 0.2
July 8.3	47.52 .79	99.0 0.6	6.89 .28	63.9 0.9	9.50 .13	41.9 1.0	45.54 .09	52.5 0.3
18.3	46.71 −.83	99.4 +0.1	6.60 −.32	64.6 −0.5	9.37 −.14	42.8 +0.7	45.43 −.11	52.2 +0.3
28.3	45.86 .85	99.2 −0.4	6.27 .34	64.8 0.0	9.21 .16	43.4 0.4	45.31 .13	51.8 0.4
Aug. 7.2	45.01 .84	98.5 1.0	5.92 .35	64.6 +0.4	9.05 .17	43.6 +0.1	45.17 .14	51.4 0.4
17.2	44.18 .82	97.3 1.5	5.56 .35	64.0 0.8	8.88 .17	43.5 −0.3	45.03 .15	50.9 0.5
27.2	43.38 .78	95.6 2.0	5.22 .34	63.0 1.2	8.71 .17	43.0 0.6	44.88 .15	50.5 0.5
Sept. 6.1	42.63 −.71	93.4 −2.4	4.89 −.31	61.6 +1.6	8.55 −.15	42.2 −1.0	44.74 −.13	50.0 +0.5
16.1	41.95 .63	90.8 2.8	4.60 .26	59.8 1.9	8.40 .13	41.0 1.3	44.61 .11	49.6 0.4
26.1	41.37 .53	87.8 3.2	4.37 .20	57.8 2.1	8.28 .11	39.4 1.7	44.51 .09	49.2 0.3
Oct. 6.1	40.90 .41	84.4 3.5	4.20 .12	55.6 2.3	8.19 .07	37.6 2.0	44.44 .05	48.9 0.2
16.0	40.56 .27	80.8 3.7	4.12 −.04	53.3 2.3	8.14 −.03	35.5 2.3	44.41 −.01	48.7 +0.1
26.0	40.37 −.12	77.0 −3.9	4.12 +.05	50.9 +2.3	8.14 +.02	33.0 −2.6	44.43 +.04	48.8 −0.1
Nov. 5.0	40.33 +.04	73.1 3.9	4.22 .15	48.7 2.1	8.18 .07	30.3 2.8	44.49 .09	49.0 0.3
15.0	40.45 .21	69.2 3.9	4.41 .24	46.7 1.9	8.28 .12	27.4 2.9	44.61 .14	49.5 0.6
24.9	40.74 .37	65.3 3.8	4.69 .32	44.9 1.6	8.43 .18	24.4 3.0	44.77 .19	50.2 0.9
Dec. 4.9	41.19 .53	61.7 3.5	5.05 .40	43.5 1.2	8.64 .23	21.4 3.0	44.99 .23	51.2 1.1
14.9	41.79 +.67	58.3 −3.2	5.48 +.46	42.6 +0.7	8.89 +.27	18.3 −3.0	45.24 +.27	52.4 −1.3
24.8	42.53 .79	55.4 2.7	5.98 .51	42.0 +0.3	9.17 .30	15.4 2.8	45.53 .30	53.7 1.5
34.8	43.38 +.89	52.9 −2.2	6.51 +.54	42.0 −0.2	9.49 +.32	12.7 −2.6	45.85 +.32	55.3 −1.6

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Ursæ Minoris.		β Bootis.		β Libræ.		μ¹ Bootis.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*
	h m 14 50	° ′ +74 36	h m 14 57	° ′ +40 49	h m 15 11	° ′ − 8 58	h m 15 20	° ′ +37 45
	s	″	s	″	s	″	s	″
(Dec.30.8)	58.63 +.73	23.1 −2.7	44.02 +.32	38.1 −2.8	0.20 +.29	14.4 −1.6	15.89 +.30	56.9 −3.0
Jan. 9.8	59.41 .82	20.7 2.1	44.37 .36	35.4 2.4	0.51 .31	16.1 1.7	16.21 .33	54.1 2.6
19.8	60.26 .87	18.9 1.5	44.74 .38	33.2 2.0	0.82 .32	17.8 1.7	16.56 .35	51.7 2.2
29.8	61.16 .90	17.7 0.9	45.12 .38	31.4 1.5	1.14 .32	19.4 1.6	16.92 .36	49.7 1.7
Feb. 8.7	62.07 .90	17.2 −0.2	45.49 .37	30.3 0.9	1.46 .31	21.0 1.5	17.28 .36	48.3 1.1
18.7	62.95 +.86	17.4 +0.5	45.85 +.35	29.7 −0.3	1.77 +.30	22.4 −1.3	17.63 +.35	47.5 −0.5
28.7	63.79 .80	18.2 1.1	46.19 .33	29.7 +0.3	2.05 .28	23.6 1.1	17.97 .33	47.3 0.0
Mar. 10.7	64.55 .71	19.7 1.7	46.51 .30	30.3 0.9	2.32 .25	24.6 0.9	18.28 .30	47.6 +0.6
20.6	65.21 .60	21.6 2.2	46.78 .26	31.4 1.4	2.57 .23	25.4 0.7	18.57 .27	48.5 1.1
30.6	65.75 .47	24.1 2.6	47.02 .22	33.0 1.8	2.78 .20	25.9 0.4	18.82 .23	49.9 1.6
Apr. 9.6	66.15 +.33	26.9 +2.9	47.22 +.17	35.0 +2.1	2.97 +.18	26.2 −0.2	19.03 +.19	51.7 +2.0
19.5	66.42 .19	29.9 3.1	47.37 .13	37.3 2.4	3.14 .15	26.4 0.0	19.20 .15	53.8 2.3
29.5	66.54 +.05	33.0 3.1	47.47 .09	39.8 2.5	3.27 .12	26.3 +0.1	19.34 .11	56.2 2.4
May 9.5	66.52 −.09	36.1 3.1	47.54 +.04	42.4 2.6	3.38 .09	26.2 0.2	19.43 .07	58.7 2.5
19.5	66.37 .22	39.1 2.9	47.56 .00	45.0 2.5	3.45 .06	25.9 0.3	19.48 +.03	61.2 2.5
29.4	66.08 −.34	42.0 +2.7	47.55 −.04	47.5 +2.4	3.50 +.03	25.6 +0.4	19.50 −.01	63.8 +2.5
June 8.4	65.68 .45	44.5 2.3	47.49 .07	49.8 2.2	3.52 .00	25.2 0.4	19.47 .04	66.2 2.3
18.4	65.18 .55	46.6 1.9	47.40 .11	51.9 2.0	3.51 −.02	24.7 0.4	19.41 .08	68.4 2.1
28.4	64.59 .63	48.3 1.5	47.28 .14	53.7 1.6	3.47 .05	24.3 0.5	19.31 .11	70.3 1.8
July 8.3	63.93 .69	49.5 1.0	47.13 .17	55.1 1.3	3.41 .07	23.8 0.4	19.18 .14	71.9 1.5
18.3	63.21 −.74	50.2 +0.5	46.95 −.19	56.2 +0.9	3.31 −.10	23.4 +0.4	19.03 −.17	73.2 +1.1
28.3	62.45 .77	50.4 −0.1	46.75 .21	56.9 +0.5	3.20 .12	23.0 0.4	18.84 .19	74.1 0.7
Aug. 7.3	61.68 .78	50.1 0.6	46.54 .22	57.1 0.0	3.07 .14	22.5 0.4	18.64 .21	74.6 +0.3
17.2	60.90 .77	49.2 1.1	46.32 .22	56.9 −0.4	2.93 .15	22.2 0.4	18.43 .22	74.7 −0.1
27.2	60.14 .74	47.8 1.6	46.10 .22	56.3 0.9	2.78 .15	21.8 0.3	18.21 .22	74.3 0.6
Sept. 6.2	59.42 −.69	45.9 −2.1	45.88 −.21	55.2 −1.3	2.63 −.14	21.6 +0.2	18.00 −.21	73.5 −1.0
16.1	58.76 .63	43.6 2.5	45.68 .19	53.7 1.7	2.49 .13	21.4 +0.1	17.79 .20	72.3 1.4
26.1	58.16 .55	40.8 2.9	45.51 .16	51.8 2.1	2.37 .11	21.4 0.0	17.61 .17	70.7 1.8
Oct. 6.1	57.67 .44	37.7 3.3	45.37 .12	49.5 2.5	2.28 .07	21.4 −0.2	17.45 .14	68.7 2.2
16.1	57.28 .33	34.3 3.6	45.28 .07	46.9 2.8	2.23 −.03	21.6 0.3	17.34 .09	66.3 2.6
26.0	57.02 −.19	30.6 −3.8	45.23 −.02	43.9 −3.1	2.22 +.01	22.0 −0.5	17.27 −.04	63.6 −2.9
Nov. 5.0	56.89 −.05	26.8 3.9	45.24 +.04	40.7 3.3	2.25 .06	22.7 0.7	17.25 +.01	60.6 3.1
15.0	56.92 +.10	22.8 3.9	45.31 .10	37.4 3.4	2.34 .11	23.5 0.9	17.29 .07	57.4 3.3
24.9	57.09 .25	19.0 3.8	45.44 .16	33.9 3.5	2.48 .16	24.5 1.2	17.39 .13	54.0 3.4
Dec. 4.9	57.42 .40	15.2 3.6	45.62 .22	30.4 3.4	2.66 .21	25.8 1.3	17.55 .19	50.6 3.4
14.9	57.90 +.54	11.7 −3.4	45.87 +.27	27.0 −3.3	2.89 +.25	27.2 −1.5	17.77 +.24	47.2 −3.3
24.9	58.51 .66	8.5 3.0	46.16 .31	23.8 3.1	3.15 .28	28.8 1.6	18.03 .28	44.0 3.1
34.8	59.23 +.76	5.7 −2.5	46.49 +.34	20.8 −2.8	3.45 +.30	30.5 −1.7	18.33 +.32	40.9 −2.9

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ^2 Ursæ Minoris.		α Coronæ Borealis.		α Serpentis.		ϵ Serpentis.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	$15^{h}\ 20^{m}$	$+72^{\circ}\ 13'$	$15^{h}\ 29^{m}$	$+27^{\circ}\ 5'$	$15^{h}\ 38^{m}$	$+\ 6^{\circ}\ 46'$	$15^{h}\ 45^{m}$	$+\ 4^{\circ}\ 48'$
	s	″	s	″	s	″	s	″
(Dec. 30.9)	51.16 +.58	36.1 −2.9	57.41 +.28	17.7 −2.7	46.13 +.27	34.4 −2.2	15.05 +.27	48.6 −2.2
Jan. 9.8	51.79 .67	33.3 2.5	57.70 .30	15.0 2.5	46.41 .29	32.2 2.1	15.33 .29	46.5 2.0
19.8	52.50 .74	31.1 1.9	58.02 .32	12.6 2.2	46.71 .30	30.2 1.9	15.62 .30	44.5 1.9
29.8	53.26 .78	29.5 1.3	58.35 .33	10.7 1.8	47.02 .31	28.4 1.7	15.93 .31	42.7 1.7
Feb. 8.8	54.05 .79	28.5 −0.6	58.68 .33	9.1 1.3	47.33 .31	26.8 1.4	16.24 .31	41.2 1.4
18.7	54.84 +.78	28.2 +0.1	59.00 +.32	8.1 −0.8	47.63 +.30	25.6 −1.1	16.54 +.30	39.9 −1.1
28.7	55.60 .74	28.7 0.7	59.31 .30	7.6 −0.3	47.92 .29	24.7 0.7	16.83 .29	39.0 0.8
Mar. 10.7	56.31 .67	29.7 1.3	59.61 .28	7.5 +0.2	48.20 .27	24.1 −0.4	17.11 .27	38.4 0.4
20.7	56.94 .59	31.3 1.9	59.88 .25	8.0 0.7	48.45 .24	23.9 0.0	17.37 .25	38.2 −0.1
30.6	57.49 .49	33.5 2.4	60.11 .22	9.0 1.2	48.69 .22	24.1 +0.3	17.61 .23	38.3 +0.2
Apr. 9.6	57.93 +.38	36.0 +2.7	60.32 +.19	10.3 +1.5	48.89 +.19	24.6 +0.6	17.82 +.20	38.7 +0.5
19.6	58.25 .26	38.9 3.0	60.50 .16	12.0 1.8	49.07 .17	25.3 0.9	18.01 .17	39.3 0.8
29.5	58.45 .14	42.0 3.1	60.64 .13	14.0 2.0	49.23 .14	26.3 1.0	18.16 .15	40.2 1.0
May 9.5	58.53 +.02	45.1 3.1	60.75 .09	16.1 2.2	49.35 .11	27.4 1.2	18.30 .12	41.2 1.1
19.5	58.49 −.10	48.3 3.1	60.82 .06	18.3 2.2	49.44 .08	28.6 1.3	18.40 .09	42.3 1.2
29.5	58.34 −.21	51.3 +2.9	60.86 +.02	20.4 +2.1	49.51 +.05	29.9 +1.3	18.47 +.06	43.5 +1.2
June 8.4	58.07 .31	54.0 2.6	60.86 −.01	22.6 2.1	49.54 +.02	31.2 1.3	18.51 +.03	44.7 1.2
18.4	57.71 .41	56.5 2.3	60.84 .04	24.5 1.9	49.55 −.01	32.4 1.2	18.52 .00	45.9 1.1
28.4	57.26 .49	58.5 1.8	60.77 .08	26.3 1.6	49.52 .04	33.6 1.1	18.50 −.03	47.0 1.0
July 8.4	56.73 .56	60.1 1.4	60.68 .11	27.8 1.4	49.46 .07	34.6 1.0	18.45 .07	47.9 0.9
18.3	56.14 −.61	61.3 +0.9	60.56 −.13	29.1 +1.1	49.38 −.10	35.5 +0.8	18.37 −.09	48.8 +0.8
28.3	55.50 .66	61.9 +0.4	60.42 .15	30.0 0.8	49.27 .12	36.2 0.7	18.26 .12	49.5 0.7
Aug. 7.3	54.83 .68	62.1 −0.1	60.25 .17	30.6 0.4	49.14 .14	36.8 0.5	18.13 .14	50.1 0.5
17.2	54.14 .69	61.7 0.6	60.07 .18	30.8 +0.1	48.99 .15	37.1 0.3	17.99 .15	50.5 0.3
27.2	53.45 .68	60.8 1.2	59.89 .19	30.7 −0.3	48.83 .16	37.3 +0.1	17.83 .16	50.7 +0.1
Sept. 6.2	52.78 −.66	59.3 −1.7	59.70 −.18	30.3 −0.7	48.68 −.16	37.3 −0.1	17.67 −.16	50.7 −0.1
16.2	52.14 .61	57.4 2.2	59.52 .17	29.4 1.0	48.52 .15	37.0 0.4	17.52 .15	50.5 0.3
26.1	51.56 .55	55.0 2.6	59.36 .15	28.2 1.4	48.38 .13	36.5 0.6	17.38 .13	50.1 0.5
Oct. 6.1	51.05 .47	52.2 3.0	59.23 .12	26.6 1.7	48.27 .10	35.8 0.9	17.26 .10	49.4 0.8
16.1	50.63 .37	49.1 3.3	59.13 .08	24.7 2.1	48.19 .06	34.8 1.1	17.17 .07	48.6 1.0
26.1	50.31 −.26	45.6 −3.6	59.07 −.03	22.4 −2.4	48.14 −.02	33.6 −1.4	17.13 −.02	47.4 −1.2
Nov. 5.0	50.11 .14	41.9 3.8	59.06 +.01	19.9 2.6	48.14 +.02	32.1 1.6	17.12 +.02	46.1 1.5
15.0	50.04 −.01	38.1 3.9	59.10 .06	17.2 2.8	48.19 .07	30.4 1.8	17.16 .07	44.5 1.7
25.0	50.10 +.13	34.2 3.9	59.20 .12	14.2 3.0	48.29 .12	28.5 2.0	17.26 .12	42.8 1.9
Dec. 4.9	50.30 .27	30.3 3.8	59.34 .17	11.2 3.1	48.44 .17	26.5 2.1	17.40 .17	40.8 2.0
14.9	50.63 +.40	26.6 −3.6	59.54 +.22	8.1 −3.0	48.64 +.21	24.3 −2.2	17.59 +.21	38.7 −2.1
24.9	51.09 .52	23.2 3.3	59.78 .26	5.1 2.9	48.87 .25	22.0 2.2	17.82 .25	36.6 2.1
34.9	51.66 +.62	20.1 −2.8	60.06 +.29	2.2 −2.7	49.13 +.28	19.8 −2.2	18.08 +.28	34.5 −2.1

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Ursæ Minoris.		ε Coronæ Borealis.		δ Scorpii.		β^1 Scorpii.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *South.*
	h m 15 47	° ′ +78 7	h m 15 52	° ′ +27 11	h m 15 53	° ′ −22 18	h m 15 58	° ′ −19 29
	s	″	s	″	s	″	s	″
(Dec. 30.9)	57.35 +.69	61.0 −3.1	57.60 +.26	58.0 −2.8	44.07 +.28	8.2 −0.9	56.85 +.27	54.3 −1.0
Jan. 9.9	58.13 .85	58.1 2.7	57.88 .29	55.2 2.6	44.37 .31	9.2 1.0	57.14 .30	55.4 1.1
19.8	59.06 .97	55.7 2.2	58.18 .31	52.7 2.3	44.69 .33	10.2 1.1	57.45 .32	56.5 1.2
29.8	60.08 1.06	53.8 1.6	58.50 .32	50.6 1.9	45.02 .33	11.4 1.2	57.77 .33	57.7 1.2
Feb. 8.8	61.18 1.11	52.6 0.9	58.82 .33	49.0 1.4	45.36 .33	12.6 1.2	58.10 .33	58.9 1.2
18.7	62.31 +1.12	52.0 −0.2	59.15 +.32	47.8 −1.0	45.69 +.33	13.8 −1.2	58.43 +.32	60.1 −1.1
28.7	63.42 1.09	52.1 +0.4	59.46 .31	47.1 −0.4	46.01 .31	15.0 1.1	58.74 .31	61.2 1.1
Mar. 10.7	64.49 1.02	52.9 1.1	59.76 .29	47.0 +0.1	46.32 .30	16.1 1.0	59.04 .29	62.2 1.0
20.7	65.47 .92	54.3 1.7	60.04 .27	47.4 0.6	46.60 .28	17.1 0.9	59.33 .27	63.1 0.8
30.6	66.33 .79	56.2 2.2	60.30 .24	48.3 1.1	46.87 .25	18.0 0.8	59.59 .25	63.9 0.7
Apr. 9.6	67.04 +.63	58.6 +2.6	60.53 +.21	49.6 +1.5	47.11 +.23	18.8 −0.7	59.84 +.23	64.5 −0.6
19.6	67.59 .47	61.3 2.9	60.72 .18	51.2 1.8	47.32 .20	19.4 0.6	60.05 .20	65.1 0.5
29.6	67.97 .29	64.3 3.1	60.89 .15	53.1 2.0	47.51 .17	20.0 0.5	60.24 .18	65.5 0.4
May 9.5	68.16 +.10	67.4 3.2	61.02 .11	55.2 2.2	47.67 .13	20.5 0.5	60.40 .15	65.8 0.3
19.5	68.17 −.08	70.6 3.1	61.12 .08	57.5 2.3	47.80 .11	20.9 0.4	60.53 .12	66.0 0.2
29.5	67.99 −.26	73.7 +3.0	61.18 +.04	59.7 +2.2	47.90 +.08	21.3 −0.3	60.63 +.08	66.2 −0.2
June 8.4	67.65 .43	76.6 2.8	61.20 +.01	62.0 2.2	47.96 .05	21.6 0.3	60.70 .05	66.3 0.1
18.4	67.14 .58	79.2 2.5	61.19 −.03	64.1 2.0	47.99 +.01	21.8 0.2	60.74 +.02	66.4 −0.1
28.4	66.49 .72	81.5 2.1	61.15 .06	66.0 1.8	47.99 −.02	22.0 0.1	60.74 −.02	66.5 0.0
July 8.4	65.71 .83	83.3 1.6	61.07 .10	67.7 1.6	47.95 .06	22.1 −0.1	60.70 .05	66.4 0.0
18.3	64.82 −.93	84.8 +1.2	60.96 −.13	69.1 +1.3	47.87 −.09	22.2 0.0	60.63 −.09	66.4 +0.1
28.3	63.85 1.02	85.7 0.7	60.82 .15	70.2 0.9	47.77 .12	22.1 +0.1	60.53 .12	66.3 0.1
Aug. 7.3	62.80 1.07	86.1 +0.2	60.66 .17	71.0 0.6	47.64 .14	22.0 0.1	60.40 .14	66.1 0.2
17.3	61.73 1.09	86.1 −0.3	60.48 .19	71.4 +0.3	47.48 .16	21.8 0.2	60.25 .16	65.9 0.2
27.2	60.63 1.09	85.5 0.9	60.29 .19	71.5 −0.1	47.32 .17	21.5 0.3	60.09 .16	65.7 0.3
Sept. 6.2	59.55 −1.07	84.4 −1.4	60.09 −.19	71.2 −0.5	47.14 −.17	21.2 +0.4	59.92 −.17	65.4 +0.3
16.2	58.51 1.02	82.8 1.7	59.90 .18	70.5 0.9	46.98 .16	20.8 0.4	59.76 .16	65.1 0.3
26.1	57.52 .94	80.7 2.3	59.72 .17	69.4 1.2	46.82 .14	20.4 0.4	59.61 .14	64.7 0.3
Oct. 6.1	56.63 .84	78.2 2.7	59.57 .14	68.0 1.6	46.70 .11	20.0 0.4	59.48 .11	64.4 0.3
16.1	55.86 .71	75.2 3.1	59.45 .10	66.2 2.0	46.60 .07	19.6 0.4	59.38 .08	64.2 0.2
26.1	55.22 −.55	72.0 −3.4	59.36 −.06	64.1 −2.3	46.55 −.03	19.3 +0.3	59.33 −.03	64.0 +0.1
Nov. 5.0	54.75 .38	68.5 3.6	59.33 −.01	61.6 2.6	46.55 +.02	19.0 +0.2	59.32 +.02	63.9 0.0
15.0	54.46 −.20	64.7 3.8	59.34 +.04	58.9 2.8	46.60 .07	19.0 0.0	59.36 .07	64.0 −0.2
25.0	54.36 .00	60.9 3.8	59.41 .09	56.1 3.0	46.70 .13	19.1 −0.2	59.46 .12	64.3 0.3
Dec. 5.0	54.46 +.20	57.1 3.8	59.53 .15	53.0 3.1	46.86 .18	19.4 0.4	59.61 .17	64.8 0.5
14.9	54.77 +.40	53.3 −3.7	59.71 +.20	49.9 −3.1	47.07 +.23	19.9 −0.6	59.80 +.22	65.4 −0.7
24.9	55.27 .59	49.8 3.4	59.93 .24	46.9 3.0	47.32 .27	20.6 0.8	60.05 .27	66.2 0.9
34.9	55.95 +.76	46.6 −3.0	60.18 +.27	44.0 −2.8	47.60 +.30	21.4 −0.9	60.32 +.29	67.2 −1.0

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	Groombridge 2320.		δ Ophiuchi.		τ Herculis.		η Draconis.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m 16 5	° ′ +68 5	h m 16 8	° ′ − 3 24	h m 16 16	° ′ +46 34	h m 16 22	° ′ +61 45
	s	″	s	″	s	″	s	″
(Dec. 30.9)	57.82 +.40	63.8 −3.3	29.67 +.25	23.0 −1.8	22.00 +.27	36.9 −3.3	26.61 +.30	51.3 −3.5
Jan. 9.9	58.26 .48	60.6 3.0	29.94 .27	24.7 1.7	22.28 .30	33.7 3.0	26.96 .38	48.0 3.1
19.8	58.78 .56	57.9 2.5	30.22 .29	26.4 1.6	22.61 .34	30.8 2.6	27.38 .44	45.1 2.7
29.8	59.37 .61	55.7 1.9	30.52 .30	28.0 1.5	22.97 .37	28.5 2.1	27.84 .48	42.6 2.1
Feb. 8.8	60.00 .64	54.1 1.3	30.83 .31	29.5 1.4	23.35 .39	26.6 1.5	28.34 .51	40.8 1.5
18.8	60.65 +.65	53.2 −0.6	31.14 +.30	30.7 −1.1	23.74 +.39	25.4 −0.9	28.86 +.52	39.6 −0.9
28.7	61.30 .64	52.9 +0.1	31.44 .29	31.7 0.9	24.12 .38	24.8 −0.3	29.38 .52	39.1 −0.2
Mar. 10.7	61.92 .61	53.4 0.8	31.72 .28	32.4 0.6	24.50 .36	24.8 +0.3	29.90 .50	39.2 +0.5
20.7	62.51 .56	54.4 1.4	31.99 .26	32.9 0.3	24.85 .34	25.4 0.9	30.38 .47	40.0 1.1
30.7	63.03 .49	56.1 1.9	32.25 .24	33.1 −0.1	25.17 .31	26.7 1.5	30.83 .42	41.4 1.7
Apr. 9.6	63.49 +.41	58.3 +2.4	32.48 +.22	33.0 +0.2	25.47 +.27	28.4 +2.0	31.23 +.37	43.4 +2.2
19.6	63.86 .33	60.8 2.7	32.69 .20	32.7 0.4	25.72 .23	30.6 2.4	31.56 .30	45.8 2.6
29.6	64.14 .24	63.7 3.0	32.87 .17	32.2 0.6	25.92 .18	33.1 2.6	31.83 .23	48.6 2.9
May 9.5	64.33 .14	66.9 3.1	33.02 .14	31.6 0.7	26.09 .14	35.8 2.9	32.03 .16	51.6 3.1
19.5	64.42 +.04	70.0 3.2	33.15 .11	30.9 0.8	26.20 .09	38.7 2.9	32.15 .09	54.7 3.2
29.5	64.42 −.06	73.2 +3.1	33.25 +.08	30.1 +0.8	26.27 +.04	41.6 +2.9	32.21 +.02	57.9 +3.1
June 8.5	64.31 .15	76.2 3.0	33.32 .05	29.3 0.8	26.28 −.01	44.5 2.8	32.18 −.06	61.0 3.0
18.4	64.12 .23	79.1 2.7	33.35 +.02	28.5 0.8	26.25 .06	47.3 2.6	32.08 .13	63.9 2.8
28.4	63.84 .32	81.6 2.4	33.36 −.01	27.7 0.7	26.17 .10	49.8 2.4	31.91 .20	66.6 2.5
July 8.4	63.49 .39	83.8 2.0	33.33 .05	27.0 0.7	26.04 .15	52.0 2.1	31.68 .26	69.0 2.2
18.4	63.06 −.45	85.6 +1.5	33.26 −.08	26.4 +0.6	25.88 −.19	53.9 +1.7	31.39 −.32	71.0 +1.8
28.3	62.58 .50	86.9 1.1	33.17 .11	25.8 0.5	25.67 .22	55.4 1.3	31.04 .37	72.6 1.4
Aug. 7.3	62.06 .54	87.7 0.6	33.05 .13	25.3 0.4	25.43 .25	56.4 0.8	30.66 .41	73.7 0.9
17.3	61.50 .57	88.0 +0.1	32.91 .15	25.0 0.3	25.17 .27	57.0 +0.4	30.24 .43	74.3 +0.4
27.2	60.92 .59	87.8 −0.5	32.75 .16	24.7 0.2	24.89 .28	57.2 −0.1	29.79 .45	74.4 −0.2
Sept. 6.2	60.34 −.58	87.1 −1.0	32.59 −.16	24.6 +0.1	24.61 −.28	56.9 −0.5	29.34 −.45	74.0 −0.7
16.2	59.77 .56	85.9 1.5	32.43 .16	24.6 −0.1	24.33 .28	56.0 1.1	28.89 .44	73.1 1.2
26.2	59.23 .52	84.1 2.0	32.28 .14	24.7 0.2	24.06 .26	54.8 1.5	28.46 .41	71.6 1.7
Oct. 6.1	58.73 .47	81.9 2.4	32.15 .12	25.0 0.4	23.81 .23	53.0 2.0	28.07 .38	69.7 2.2
16.1	58.30 .40	79.3 2.8	32.05 .08	25.5 0.6	23.60 .19	50.8 2.4	27.71 .32	67.3 2.6
26.1	57.94 −.31	76.2 −3.2	31.99 −.04	26.1 −0.8	23.43 −.14	48.2 −2.8	27.42 −.26	64.5 −3.0
Nov. 5.1	57.67 .22	72.9 3.5	31.97 .00	27.0 0.9	23.32 .08	45.3 3.1	27.19 .18	61.3 3.3
15.0	57.50 −.11	69.2 3.7	31.99 +.05	28.0 1.1	23.26 −.02	42.0 3.4	27.05 .10	57.8 3.6
25.0	57.44 .00	65.4 3.8	32.07 .10	29.3 1.4	23.27 +.04	38.6 3.5	27.00 −.01	54.1 3.8
Dec. 5.0	57.50 +.12	61.6 3.9	32.19 .15	30.7 1.5	23.35 .11	34.9 3.6	27.03 +.08	50.3 3.8
14.9	57.68 +.23	57.7 −3.8	32.37 +.19	32.2 −1.6	23.49 +.17	31.3 −3.6	27.16 +.17	46.5 −3.8
24.9	57.96 .34	54.0 3.6	32.58 .23	33.9 1.7	23.69 .23	27.8 3.5	27.38 .26	42.7 3.6
34.9	58.35 +.43	50.6 −3.2	32.83 +.27	35.6 −1.8	23.95 +.28	24.4 −3.3	27.68 +.33	39.2 −3.4

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Scorpii. (*Antares.*)		β Herculis.		A Draconis.		ζ Ophiuchi.	
	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*
	h m	° ′	h m	° ′	h m	° ′	h m	° ′
	16 22	−26 10	16 25	+21 43	16 28	+69 0	16 31	−10 20
	s	″	s	″	s	″	s	″
(Dec. 30.9)	33.75 +.27	56.1 −0.5	24.83 +.23	55.6 −2.8	8.89 +.35	24.4 −3.5	0.62 +.24	23.5 −1.3
Jan. 9.9	34.04 .30	56.7 0.6	25.08 .26	52.9 2.6	9.29 .45	21.0 3.1	0.88 .27	24.8 1.3
19.9	34.35 .32	57.4 0.8	25.35 .28	50.5 2.3	9.79 .54	18.1 2.7	1.16 .29	26.2 1.3
29.8	34.68 .33	58.2 0.9	25.65 .30	48.3 2.0	10.36 .60	15.7 2.2	1.46 .30	27.5 1.3
Feb. 8.8	35.02 .34	59.1 0.9	25.95 .31	46.5 1.6	10.99 .64	13.8 1.5	1.76 .31	28.7 1.1
18.8	35.36 +.34	60.1 −1.0	26.27 +.31	45.2 −1.1	11.65 +.66	12.6 −0.9	2.07 +.31	29.8 −1.0
28.7	35.69 .33	61.0 1.0	26.57 .30	44.3 0.6	12.31 .66	12.1 −0.2	2.38 .30	30.7 0.8
Mar. 10.7	36.02 .32	62.0 0.9	26.87 .29	44.0 −0.1	12.97 .64	12.3 +0.5	2.68 .29	31.5 0.7
20.7	36.33 .30	62.9 0.9	27.16 .26	44.1 +0.3	13.60 .60	13.1 1.1	2.96 .28	32.0 0.5
30.7	36.62 .28	63.7 0.8	27.43 .25	44.6 0.8	14.17 .54	14.5 1.7	3.23 .26	32.4 −0.2
Apr. 9.6	36.89 +.26	64.5 −0.7	27.67 +.23	45.6 +1.2	14.68 +.47	16.5 +2.2	3.48 +.24	32.5 0.0
19.6	37.14 .24	65.2 0.7	27.89 .20	47.0 1.5	15.11 .38	18.9 2.6	3.71 .22	32.5 +0.1
29.6	37.36 .21	65.8 0.6	28.08 .18	48.7 1.8	15.45 .29	21.7 2.9	3.92 .20	32.3 0.2
May 9.6	37.56 .18	66.4 0.6	28.25 .15	50.6 2.0	15.70 .20	24.7 3.1	4.11 .17	32.0 0.4
19.5	37.72 .15	67.0 0.5	28.38 .12	52.6 2.1	15.84 +.10	27.9 3.2	4.26 .14	31.5 0.4
29.5	37.85 +.11	67.5 −0.5	28.47 +.08	54.7 +2.1	15.88 −.01	31.1 +3.2	4.39 +.11	31.1 +0.5
June 8.5	37.94 .08	68.0 0.5	28.53 .04	56.8 2.1	15.82 .11	34.3 3.1	4.48 .07	30.6 0.5
18.4	38.00 +.04	68.4 0.4	28.56 +.01	58.9 2.0	15.67 .21	37.2 2.9	4.53 .04	30.1 0.5
28.4	38.02 .00	68.8 0.4	28.55 −.03	60.8 1.8	15.41 .29	40.0 2.6	4.56 +.01	29.7 0.5
July 8.4	38.00 −.04	69.1 0.3	28.50 .06	62.5 1.6	15.08 .38	42.4 2.2	4.55 −.03	29.2 0.4
18.4	37.94 −.07	69.4 −0.2	28.42 −.10	64.0 +1.4	14.66 −.45	44.4 +1.8	4.50 −.06	28.8 +0.4
28.3	37.85 .11	69.6 −0.1	28.31 .13	65.3 1.1	14.18 .51	46.0 1.4	4.42 .10	28.5 0.3
Aug. 7.3	37.72 .14	69.7 0.0	28.17 .15	66.2 0.8	13.64 .56	47.1 0.9	4.31 .12	28.2 0.3
17.3	37.57 .16	69.7 +0.1	28.01 .17	66.9 0.5	13.06 .59	47.8 +0.4	4.17 .15	27.9 0.2
27.3	37.40 .18	69.6 0.2	27.83 .18	67.2 +0.2	12.45 .61	47.9 −0.1	4.02 .16	27.7 0.2
Sept. 6.2	37.22 −.18	69.3 +0.3	27.64 −.19	67.2 −0.2	11.83 −.62	47.5 −0.7	3.86 −.17	27.5 +0.1
16.2	37.04 .18	69.0 0.4	27.45 .19	66.8 0.5	11.21 .61	46.6 1.2	3.69 .16	27.4 +0.1
26.2	36.87 .16	68.6 0.4	27.26 .17	66.1 0.9	10.61 .58	45.1 1.7	3.53 .15	27.4 0.0
Oct. 6.1	36.72 .14	68.2 0.5	27.10 .15	65.1 1.2	10.06 .53	43.2 2.2	3.38 .13	27.4 −0.1
16.1	36.60 .10	67.7 0.5	26.96 .12	63.7 1.6	9.56 .46	40.8 2.6	3.27 .10	27.6 0.2
26.1	36.52 −.06	67.2 +0.4	26.86 −.08	61.9 −1.9	9.13 −.38	38.0 −3.0	3.19 −.06	27.9 −0.4
Nov. 5.1	36.49 −.01	66.8 0.4	26.80 −.04	59.9 2.2	8.79 .29	34.8 3.3	3.15 −.01	28.3 0.5
15.0	36.51 +.05	66.5 0.3	26.79 +.01	57.6 2.4	8.55 .18	31.3 3.6	3.16 +.03	28.9 0.7
25.0	36.59 .10	66.3 +0.1	26.83 .06	55.0 2.6	8.43 −.07	27.6 3.8	3.22 .09	29.7 0.8
Dec. 5.0	36.72 .16	66.3 0.0	26.92 .12	52.3 2.8	8.42 +.05	23.8 3.8	3.33 .13	30.6 1.0
15.0	36.90 +.21	66.4 −0.2	27.06 +.16	49.5 −2.8	8.53 +.17	19.9 −3.8	3.49 +.18	31.7 −1.1
24.9	37.13 .25	66.7 0.4	27.25 .21	46.7 2.8	8.76 .29	16.2 3.6	3.69 .22	32.9 1.3
34.9	37.40 +.29	67.2 −0.6	27.47 +.24	43.9 −2.7	9.10 +.39	12.6 −3.4	3.93 +.26	34.2 −1.4

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Trianguli Australis.		η Herculis.		κ Ophiuchi.		ε Ursæ Minoris.	
	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	$16^{h}\ 36^{m}$	$-68^{\circ}\ 49'$	$16^{h}\ 39^{m}$	$+39^{\circ}\ 7'$	$16^{h}\ 52^{m}$	$+\ 9^{\circ}\ 32'$	$16^{h}\ 57^{m}$	$+82^{\circ}\ 12'$
	s	″	s	″	s	″	s	″
(Dec. 30.9)	50.11 +.54	5.6 +1.8	3.18 +.22	59.6 −3.3	22.73 +.21	56.0 −2.3	14.32 +.54	64.2 −3.5
Jan. 9.9	50.69 .62	4.0 1.4	3.43 .27	56.4 3.0	22.96 .24	53.8 2.1	15.01 .83	60.8 3.2
19.8	51.35 .68	2.8 1.0	3.71 .30	53.5 2.7	23.21 .26	51.7 2.0	15.98 1.09	57.8 2.8
29.8	52.06 .73	2.1 0.5	4.03 .32	51.0 2.3	23.48 .28	49.8 1.8	17.18 1.31	55.3 2.3
Feb. 8.8	52.80 .76	1.8 +0.1	4.36 .34	49.0 1.7	23.77 .29	48.1 1.5	18.59 1.47	53.2 1.7
18.8	53.57 +.77	1.8 −0.3	4.71 +.35	47.5 −1.2	24.07 +.30	46.8 −1.1	20.13+1.58	51.8 −1.1
28.7	54.34 .76	2.3 0.6	5.06 .35	46.7 −0.6	24.36 .30	45.9 0.8	21.75 1.64	51.0 −0.5
Mar. 10.7	55.09 .74	3.2 1.0	5.40 .34	46.4 0.0	24.66 .29	45.3 −0.4	23.40 1.63	50.8 +0.2
20.7	55.82 .71	4.4 1.4	5.73 .32	46.7 +0.6	24.94 .28	45.1 0.0	25.00 1.56	51.3 0.8
30.7	56.51 .67	6.0 1.7	6.04 .30	47.6 1.2	25.21 .27	45.3 +0.4	26.50 1.44	52.5 1.4
Apr. 9.6	57.16 +.62	7.9 −2.0	6.33 +.27	49.0 +1.6	25.46 +.25	45.9 +0.7	27.86+1.27	54.1 +2.0
19.6	57.74 .55	10.0 2.2	6.58 .24	50.9 2.0	25.70 .23	46.8 1.0	29.02 1.05	56.3 2.4
29.6	58.26 .48	12.3 2.4	6.80 .20	53.2 2.4	25.91 .20	48.0 1.3	29.96 .80	58.9 2.7
May 9.5	58.71 .41	14.8 2.5	6.98 .16	55.7 2.6	26.10 .17	49.3 1.4	30.63 .54	61.8 3.0
19.5	59.07 .32	17.4 2.6	7.13 .12	58.4 2.7	26.26 .15	50.8 1.5	31.04+ .26	64.8 3.1
29.5	59.35 +.23	20.1 −2.7	7.22 +.08	61.1 +2.8	26.39 +.11	52.4 +1.6	31.16− .02	68.0 +3.1
June 8.5	59.53 .13	22.7 2.7	7.28 +.03	63.9 2.7	26.49 .08	54.0 1.6	31.00 .30	71.1 3.1
18.4	59.61 +.03	25.4 2.6	7.29 −.01	66.6 2.6	26.55 .05	55.6 1.6	30.57 .56	74.1 2.9
28.4	59.59 −.07	27.9 2.4	7.26 .05	69.1 2.4	26.58 +.01	57.2 1.5	29.87 .82	76.9 2.7
July 8.4	59.47 .17	30.2 2.2	7.18 .10	71.4 2.2	26.57 −.03	58.6 1.3	28.93 1.06	79.5 2.4
18.4	59.25 −.26	32.3 −1.9	7.07 −.14	73.4 +1.8	26.52 −.06	59.8 +1.2	27.77−1.26	81.7 +2.0
28.3	58.95 .34	34.1 1.6	6.91 .17	75.0 1.5	26.44 .10	60.9 1.0	26.42 1.43	83.5 1.6
Aug. 7.3	58.57 .41	35.5 1.2	6.72 .20	76.3 1.1	26.33 .12	61.7 0.7	24.91 1.57	84.9 1.2
17.3	58.12 .47	36.4 0.7	6.51 .23	77.2 0.6	26.19 .15	62.4 0.6	23.28 1.68	85.8 0.7
27.2	57.63 .50	36.9 −0.3	6.27 .24	77.6 +0.2	26.03 .17	62.8 +0.3	21.55 1.75	86.3 +0.2
Sept. 6.2	57.12 −.51	37.0 +0.2	6.02 −.25	77.6 −0.2	25.86 −.18	63.0 0.0	19.77−1.79	86.2 −0.3
16.2	56.60 .50	36.6 0.7	5.77 .25	77.1 0.7	25.68 .18	62.9 −0.2	17.98 1.78	85.6 0.8
26.2	56.11 .47	35.7 1.1	5.53 .24	76.2 1.1	25.51 .17	62.6 0.5	16.22 1.74	84.5 1.3
Oct. 6.1	55.66 .41	34.4 1.5	5.31 .21	74.8 1.6	25.35 .15	62.0 0.7	14.53 1.64	83.0 1.8
16.1	55.28 .33	32.6 1.9	5.11 .18	73.0 2.0	25.21 .12	61.1 1.0	12.96 1.50	81.0 2.2
26.1	55.00 −.23	30.6 +2.2	4.95 −.14	70.8 −2.4	25.10 −.09	60.0 −1.3	11.54−1.33	78.5 −2.6
Nov. 5.1	54.82 −.12	28.3 2.4	4.84 .09	68.2 2.7	25.04 −.05	58.6 1.5	10.32 1.11	75.7 3.0
15.0	54.75 .00	25.8 2.5	4.77 −.03	65.3 3.0	25.01 .00	57.0 1.7	9.33 .86	72.5 3.3
25.0	54.82 +.13	23.4 2.5	4.77 +.02	62.1 3.3	25.03 +.05	55.2 1.9	8.61 .58	69.1 3.5
Dec. 5.0	55.01 .26	20.9 2.4	4.83 .08	58.8 3.4	25.11 .10	53.1 2.1	8.18 −.28	65.5 3.6
14.9	55.33 +.38	18.7 +2.2	4.94 +.14	55.3 −3.4	25.23 +.14	51.0 −2.2	8.05 +.04	61.8 −3.7
24.9	55.76 .48	16.6 1.9	5.11 .20	51.9 3.4	25.39 .17	48.7 2.2	8.25 .34	58.1 3.6
34.9	56.30 +.57	14.8 +1.6	5.33 +.25	48.6 −3.2	25.60 +.22	46.5 −2.2	8.75 +.59	54.6 −3.4

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*d* Herculis.		α^1 Herculis.		*b* Ophiuchi.		*β* Draconis.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*
	$16^h\ 57^m$	+38° 43′	$17^h\ 9^m$	+14° 30′	$17^h\ 19^m$	−24° 4′	$17^h\ 27^m$	+52° 22′
	s	″	s	″	s	″	s	″
(Dec. 30.9)	28.25 +.22	45.3 −3.2	33.01 +.19	64.3 −2.5	32.96 +.21	14.3 −0.3	52.92 +.17	60.1 −3.7
Jan. 9.9	28.48 .24	42.2 3.0	33.21 .22	61.9 2.3	33.20 .25	14.6 0.4	53.13 .23	56.6 3.4
19.9	28.74 .27	39.3 2.7	33.45 .25	59.6 2.2	33.47 .28	15.0 0.5	53.39 .29	53.4 3.1
29.8	29.03 .30	36.8 2.3	33.72 .27	57.6 1.9	33.76 .30	15.5 0.5	53.70 .33	50.4 2.7
Feb. 8.8	29.34 .32	34.8 1.8	34.00 .29	55.8 1.6	34.07 .32	16.1 0.5	54.06 .37	47.9 2.2
18.8	29.66 +.33	33.2 −1.3	34.29 +.29	54.4 −1.2	34.39 +.32	16.6 −0.5	54.44 +.40	46.0 −1.6
28.8	30.00 .33	32.2 0.8	34.59 .30	53.4 0.8	34.72 .33	17.2 0.5	54.84 .41	44.7 1.0
Mar. 10.7	30.32 .32	31.7 −0.2	34.88 .29	52.8 −0.4	35.04 .32	17.6 0.5	55.26 .41	44.1 −0.3
20.7	30.64 .31	31.8 +0.4	35.17 .28	52.7 +0.1	35.37 .32	18.1 0.4	55.67 .40	44.1 +0.3
30.7	30.94 .30	32.5 0.9	35.45 .28	53.0 0.5	35.68 .31	16.4 0.3	56.07 .39	44.7 0.9
Apr. 9.6	31.23 +.27	33.7 +1.4	35.72 +.26	53.6 +0.9	35.98 +.29	18.7 −0.3	56.44 +.36	45.9 +1.5
19.6	31.48 .24	35.3 1.8	35.97 .24	54.7 1.2	36.26 .28	19.0 0.2	56.79 .33	47.7 2.0
29.6	31.71 .21	37.4 2.2	36.19 .21	56.1 1.5	36.53 .26	19.2 0.2	57.09 .29	50.0 2.5
May 9.6	31.91 .18	39.7 2.4	36.39 .19	57.7 1.7	36.77 .23	19.4 0.2	57.36 .24	52.6 2.8
19.5	32.07 .14	42.2 2.6	36.57 .16	59.4 1.8	36.99 .20	19.6 0.2	57.57 .19	55.5 3.0
29.5	32.19 +.10	44.8 +2.6	36.71 +.13	61.3 +1.9	37.18 +.17	19.7 −0.2	57.73 +.13	58.6 +3.1
June 8.5	32.27 .06	47.5 2.6	36.82 .09	63.2 1.9	37.33 .13	19.9 0.2	57.83 .07	61.8 3.2
18.5	32.31 +.02	50.1 2.5	36.89 .06	65.1 1.8	37.44 .09	20.1 0.2	57.88 +.01	64.9 3.1
28.4	32.31 −.02	52.6 2.4	36.93 +.02	66.9 1.7	37.51 .05	20.4 0.2	57.86 −.05	68.0 2.9
July 8.4	32.27 .06	54.8 2.2	36.93 −.02	68.6 1.6	37.55 +.01	20.6 0.2	57.78 .11	70.8 2.7
18.4	32.18 −.10	56.9 +1.9	36.89 −.06	70.1 +1.5	37.54 −.03	20.8 −0.2	57.65 −.16	73.4 +2.4
28.3	32.06 .14	58.6 1.6	36.82 .09	71.4 1.2	37.48 .07	21.1 0.2	57.46 .21	75.7 2.1
Aug. 7.3	31.90 .17	60.0 1.2	36.71 .12	72.5 0.9	37.39 .11	21.3 0.2	57.22 .26	77.6 1.7
17.3	31.71 .20	61.0 0.8	36.57 .15	73.3 0.7	37.27 .14	21.5 0.1	56.95 .29	79.1 1.2
27.3	31.50 .22	61.6 +0.4	36.41 .17	73.8 0.4	37.11 .16	21.6 −0.1	56.63 .32	80.1 0.8
Sept. 6.2	31.27 −.23	61.8 0.0	36.23 −.18	74.1 +0.1	36.94 −.18	21.6 0.0	56.30 −.34	80.6 +0.3
16.2	31.04 .23	61.5 −0.4	36.04 .19	74.1 −0.2	36.76 .18	21.6 0.0	55.95 .35	80.7 −0.2
26.2	30.82 .22	60.9 0.9	35.86 .18	73.8 0.5	36.57 .18	21.5 +0.1	55.60 .35	80.2 0.7
Oct. 6.2	30.60 .20	59.8 1.3	35.69 .17	73.1 0.8	36.40 .17	21.4 0.2	55.26 .33	79.2 1.2
16.1	30.41 .18	58.3 1.7	35.53 .14	72.2 1.1	36.25 .14	21.2 0.2	54.94 .30	77.7 1.7
26.1	30.25 −.14	56.4 −2.1	35.41 −.11	71.0 −1.4	36.13 −.10	21.0 +0.2	54.66 −.26	75.8 −2.2
Nov. 5.1	30.14 .09	54.1 2.4	35.32 .07	69.4 1.7	36.05 .06	20.7 0.2	54.42 .21	73.3 2.6
15.0	30.07 −.04	51.5 2.7	35.28 −.02	67.7 1.9	36.01 −.01	20.5 0.2	54.24 .15	70.5 3.0
25.0	30.05 +.01	48.6 3.0	35.28 +.03	65.6 2.1	36.03 +.04	20.4 +0.1	54.12 .08	67.4 3.3
Dec. 5.0	30.09 .07	45.5 3.2	35.33 .08	63.4 2.3	36.10 .10	20.4 0.0	54.07 −.01	63.9 3.5
15.0	30.19 +.12	42.3 −3.2	35.43 +.12	61.0 −2.4	36.22 +.15	20.5 −0.1	54.10 +.06	60.3 −3.6
24.9	30.34 .17	39.0 3.2	35.58 .17	58.6 2.4	36.40 .19	20.7 0.2	54.19 .13	56.7 3.7
34.9	30.54 +.23	35.9 −3.1	35.77 +.20	56.2 −2.4	36.61 +.23	20.9 −0.3	54.36 +.20	53.0 −3.6

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Ophiuchi.		ω Draconis.		μ Herculis.		ψ¹ Draconis.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	$17^{h}\ 29^{m}$	$+12^{\circ}\ 38'$	$17^{h}\ 37^{m}$	$+68^{\circ}\ 48'$	$17^{h}\ 42^{m}$	$+27^{\circ}\ 46'$	$17^{h}\ 43^{m}$	$+72^{\circ}\ 11'$
	s	″	s	″	s	″	s	″
(Dec.30.9)	44.72 +.17	30.8 −2.4	32.57 +.17	31.9 −3.7	4.65 +.15	70.1 −3.0	50.71 +.16	70.2 −3.7
Jan. 9.9	44.90 .20	28.5 2.2	32.80 .26	28.3 3.5	4.83 .19	67.1 2.9	50.94 .29	66.5 3.5
19.9	45.13 .24	26.3 2.1	33.13 .38	24.9 3.2	5.04 .23	64.3 2.7	51.29 .42	63.1 3.3
29.9	45.38 .26	24.3 1.9	33.56 .47	21.8 2.8	5.28 .26	61.8 2.4	51.77 .53	60.0 2.9
Feb. 8.8	45.65 .28	22.5 1.6	34.08 .54	19.3 2.3	5.55 .28	59.6 2.0	52.34 .61	57.4 2.4
18.8	45.93 +.29	21.1 −1.2	34.65 +.60	17.3 −1.7	5.84 +.30	57.9 −1.5	53.00 +.68	55.3 −1.8
28.8	46.22 .29	20.1 0.8	35.27 .63	15.9 1.1	6.15 .30	56.6 1.0	53.71 .73	53.9 1.2
Mar. 10.7	46.52 .29	19.4 −0.4	35.91 .65	15.1 −0.4	6.45 .31	55.8 −0.5	54.45 .75	53.0 −0.5
20.7	46.81 .29	19.2 0.0	36.56 .64	15.1 +0.3	6.76 .30	55.6 0.0	55.21 .75	52.9 +0.2
30.7	47.09 .28	19.4 +0.4	37.19 .61	15.7 0.9	7.06 .30	55.9 +0.6	55.94 .72	53.4 0.8
Apr. 9.7	47.36 +.27	20.0 +0.8	37.79 +.57	16.9 +1.5	7.36 +.29	56.7 +1.1	56.64 +.67	54.5 +1.4
19.6	47.62 .25	21.0 1.1	38.33 .51	18.7 2.1	7.63 .27	58.0 1.5	57.28 .60	56.3 2.0
29.6	47.86 .23	22.3 1.4	38.81 .44	21.0 2.5	7.89 .25	59.7 1.9	57.84 .51	58.5 2.4
May 9.6	48.08 .21	23.8 1.6	39.20 .35	23.7 2.8	8.12 .22	61.7 2.1	58.30 .41	61.1 2.8
19.6	48.27 .18	25.5 1.8	39.51 .26	26.7 3.1	8.32 .19	64.0 2.4	58.66 .30	64.1 3.1
29.5	48.43 +.15	27.3 +1.8	39.72 +.16	29.9 +3.2	8.49 +.15	66.5 +2.5	58.91 +.18	67.3 +3.2
June 8.5	48.56 .11	29.2 1.9	39.83 +.06	33.2 3.3	8.62 .11	69.0 2.5	59.03 +.06	70.5 3.3
18.5	48.66 .08	31.1 1.8	39.83 −.05	36.5 3.2	8.71 .07	71.5 2.5	59.04 −.06	73.8 3.2
28.4	48.71 +.04	32.8 1.7	39.73 .15	39.7 3.1	8.77 +.03	74.0 2.4	58.92 .18	77.0 3.1
July 8.4	48.73 .00	34.5 1.6	39.53 .24	42.7 2.9	8.77 −.01	76.3 2.2	58.68 .29	80.0 2.9
18.4	48.71 −.04	36.0 +1.5	39.24 −.34	45.5 +2.6	8.74 −.06	78.4 +2.0	58.33 −.40	82.8 +2.6
28.4	48.65 .08	37.4 1.2	38.86 .42	47.9 2.2	8.66 .10	80.3 1.8	57.87 .50	85.3 2.3
Aug. 7.3	48.56 .11	38.5 1.0	38.41 .49	50.0 1.8	8.55 .13	81.9 1.5	57.33 .59	87.3 1.9
17.3	48.43 .14	39.3 0.7	37.89 .55	51.6 1.4	8.40 .17	83.1 1.1	56.70 .66	89.0 1.4
27.3	48.28 .16	39.9 0.5	37.31 .60	52.8 0.9	8.22 .19	84.1 0.7	56.01 .72	90.2 1.0
Sept. 6.3	48.11 −.18	40.3 +0.2	36.69 −.63	53.4 +0.4	8.01 −.21	84.6 +0.4	55.27 −.75	91.0 +0.5
16.2	47.93 .18	40.4 −0.1	36.05 .64	53.6 −0.1	7.80 .22	84.8 0.0	54.50 .77	91.2 0.0
26.2	47.74 .18	40.2 0.3	35.41 .64	53.2 0.6	7.58 .22	84.6 −0.4	53.73 .77	90.9 −0.6
Oct. 6.2	47.56 .17	39.7 0.6	34.78 .62	52.3 1.2	7.37 .21	84.0 0.8	52.96 .75	90.1 1.1
16.1	47.40 .15	38.9 0.9	34.18 .58	50.8 1.7	7.17 .19	82.9 1.2	52.23 .70	88.7 1.6
26.1	47.27 −.12	37.8 −1.2	33.63 −.52	48.9 −2.2	7.00 −.16	81.5 −1.6	51.55 −.64	86.9 −2.1
Nov. 5.1	47.17 .08	36.4 1.5	33.14 .44	46.5 2.6	6.86 .12	79.7 2.0	50.95 .56	84.5 2.6
15.1	47.11 −.04	34.8 1.7	32.74 .35	43.7 3.0	6.77 .07	77.6 2.3	50.44 .45	81.7 3.0
25.0	47.10 +.01	33.0 2.0	32.43 .25	40.5 3.3	6.72 −.02	75.2 2.6	50.04 .34	78.6 3.3
Dec. 5.0	47.13 .06	30.9 2.1	32.24 .14	37.0 3.6	6.72 +.02	72.5 2.8	49.77 .21	75.2 3.6
15.0	47.21 +.10	28.7 −2.3	32.16 −.02	33.4 −3.7	6.77 +.08	69.6 −3.0	49.63 −.07	71.5 −3.7
25.0	47.34 .15	26.4 2.3	32.19 +.10	29.6 3.7	6.87 .12	66.6 3.0	49.63 +.07	67.8 3.7
34.9	47.51 +.19	24.0 −2.3	32.35 +.21	25.9 −3.6	7.02 +.16	63.6 −2.9	49.77 +.21	64.1 −3.6

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Draconis.		γ² Sagittarii.		μ Sagittarii.		η Serpentis.	
	Right Ascension.	Declination *North*.	Right Ascension.	Declination *South*.	Right Ascension.	Declination *South*.	Right Ascension.	Declination *South*.
	h m 17 53	° ′ +51 29	h m 17 58	° ′ −30 25	h m 18 7	° ′ −21 5	h m 18 15	° ′ − 2 55
	s	″	s	″	s	″	s	″
Jan. 0.0	59.14 +.13	67.6 −3.6	37.88 +.19	24.3 +0.2	4.94 +.16	10.2 −0.3	31.64 +.14	34.3 −1.4
9.9	59.30 .19	64.0 3.5	38.09 .23	24.1 0.2	5.13 .20	10.5 0.3	31.80 .17	35.6 1.4
19.9	59.52 .25	60.7 3.2	38.34 .26	24.0 +0.1	5.36 .24	10.9 0.3	31.99 .21	37.0 1.3
29.9	59.79 .30	57.6 2.9	38.62 .29	23.9 0.0	5.61 .26	11.2 0.3	32.21 .23	38.2 1.2
Feb. 8.9	60.12 .34	54.9 2.4	38.92 .31	23.9 0.0	5.88 .28	11.5 0.3	32.46 .25	39.4 1.0
18.8	60.47 +.37	52.8 −1.9	39.24 +.33	23.9 0.0	5.17 +.30	11.8 −0.3	32.72 +.27	40.3 −0.8
28.8	60.86 .39	51.2 1.2	39.58 .34	24.0 −0.1	6.48 .31	12.1 0.2	32.99 .28	41.0 0.6
Mar. 10.8	61.25 .40	50.3 −0.6	39.91 .34	24.0 0.1	6.79 .31	12.2 −0.1	33.28 .29	41.5 −0.3
20.8	61.66 .40	50.0 0.0	40.26 .34	24.1 0.1	7.11 .32	12.3 0 0	33.57 .29	41.6 0.0
30.7	62.06 .39	50.4 +0.7	40.60 .34	24.2 0.1	7.42 .31	12.3 +0.1	33.86 .29	41.5 +0.2
Apr. 9.7	62.44 +.37	51.4 +1.3	40.93 +.33	24.4 −0.1	7.73 +.31	12.2 +0.1	34.14 +.28	41.2 +0.5
19.7	62.80 .35	52.9 1.8	41.25 .32	24.5 0.2	8.04 .29	12.0 0.2	34.42 .27	40.6 0.7
29.6	63.13 .31	55.0 2.3	41.56 .30	24.7 0.2	8.33 .28	11.8 0.2	34.69 .26	39.7 0.9
May 9.6	63.42 .27	57.5 2.7	41.85 .28	24.9 0.2	8.60 .26	11.5 0.2	34.95 .24	38.8 1.0
19.6	63.66 .22	60.3 2.9	42.11 .25	25.1 0.3	8.85 .24	11.3 0.2	35.18 .22	37.7 1.1
29.6	63.86 +.17	63.3 +3.1	42.35 +.22	25.5 −0.4	9.07 +.21	11.1 +0.2	35.39 +.20	36.5 +1.2
June 8.5	64.00 .11	66.5 3.2	42.54 .18	25.9 0.4	9.27 .18	10.9 0.2	35.57 .16	35.3 1.2
18.5	64.08 +.05	69.7 3.2	42.71 .14	26.3 0.5	9.43 .14	10.8 +0.1	35.72 .13	34.1 1.1
28.5	64.10 −.01	72.9 3.1	42.83 .10	26.8 0.6	9.55 .10	10.7 0.0	35.82 .09	33.0 1.1
July 8.4	64.07 .07	75.9 2.9	42.90 +.05	27.4 0.6	9.62 .06	10.7 0.0	35.90 .05	32.0 1.0
18.4	63.97 −.12	78.6 +2.6	42.92 .00	28.0 −0.6	9.65 +.01	10.8 −0.1	35.93 +.01	31.1 +0.9
28.4	63.81 .18	81.1 2.3	42.90 −.04	28.6 0.0	9.64 −.03	10.9 0.2	35.91 −.03	30.3 0.7
Aug. 7.4	63.61 .23	83.3 2.0	42.84 .09	29.2 0.6	9.59 .07	11.1 0.2	35.86 .07	29.6 0.6
17.3	63.35 .27	85.1 1.5	42.73 .13	29.7 0.5	9.49 .11	11.3 0.2	35.77 .11	29.1 0 4
27.3	63.06 .31	86.4 1.1	42.58 .16	30.2 0.4	9.36 .14	11.5 0.2	35.65 .13	28.8 0.3
Sept. 6.3	62.74 −.33	87.3 +0.6	42.41 −.18	30.5 −0.3	9.21 −.16	11.6 −0.2	35.50 −.16	28.5 +0.1
16.3	62.40 .34	87.7 +0.1	42.22 .19	30.7 −0.2	9.03 .18	11.8 0.1	35.34 .17	28.5 0.0
26.2	62.06 .34	87.6 −0.4	42.02 .20	30.8 0.0	8.85 .18	11.9 0.1	35.16 .17	28.5 −0.1
Oct. 6.2	61.71 .33	86.9 0.9	41.83 .19	30.8 +0.1	8.67 .17	12.0 −0.1	34.99 .17	28.8 0.3
16.2	61.39 .31	85.8 1.4	41.65 .17	30.6 0.2	8.50 .16	12.0 0.0	34.82 .16	29.1 0.4
26.1	61.09 −.28	84.1 −1.9	41.49 −.14	30.3 +0.3	8.36 −.13	12.0 0.0	34.68 −.13	29.7 −0.6
Nov. 5.1	60.83 .23	82.0 2.3	41.38 .09	30.0 0.4	8.25 .09	12.0 0.0	34.56 .10	30.3 0.8
15.1	60.63 .18	79.5 2.7	41.31 −.05	29.5 0.4	8.17 −.05	12.1 0.0	34.48 .06	31.2 0.9
25.1	60.48 .12	76.6 3.1	41.28 .00	29.1 0.5	8.15 .00	12.1 −0.1	34.44 −.02	32.1 1.0
Dec. 5.0	60.40 −.05	73.3 3.4	41.32 +.06	28.6 0.4	8.17 +.05	12.2 0.1	34.45 +.03	33.2 1.2
15.0	60.38 +.02	69.8 −3.5	41.40 +.11	28.2 +0.4	8.24 +.10	12.3 −0.2	34.50 +.07	34.5 −1.3
25.0	60.44 .09	66.2 3.6	41.54 .16	27.9 0.3	8.36 .14	12.5 0.2	34.60 .12	35.8 1.3
35.0	60.56 +.15	62.6 −3.5	41.73 +.20	27.6 +0.2	8.53 +.18	12.8 −0.3	34.73 +.15	37.1 −1.4

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	1 Aquilæ.		α Lyræ. (*Vega.*)		σ Octantis.		β Lyræ.	
	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*
	h m 18 29	° ′ − 8 19	h m 18 33	° ′ +38 40	h 18	° ′ −89 15	h m 18 45	° ′ +33 13
	s	″	s	″	m s	″	s	″
Jan. 0.0	7.61 +.13	14.3 −1.0	8.50 +.09	51.7 −3.2	38 14.3+ 4.5	62.2 +3.4	56.64 +.07	64.3 −3.0
10.0	7.77 .17	15.3 1.0	8.61 .13	48.5 3.2	38 20.3 7.6	58.9 3.2	56.74 .12	61.3 3.0
19.9	7.95 .20	16.3 0.9	8.77 .18	45.3 3.0	38 29.5 10.5	55.8 3.0	56.89 .17	58.3 2.9
29.9	8.17 .23	17.2 0.9	8.97 .22	42.4 2.8	38 41.3 13.1	53.0 2.7	57.07 .20	55.5 2.7
Feb. 8.9	8.41 .25	18.0 0.8	9.21 .26	39.8 2.4	38 55.6 15.3	50.5 2.4	57.30 .24	53.0 2.3
18.8	8.67 +.27	18.7 −0.6	9.49 +.29	37.6 −2.0	39 11.9+17.1	48.3 +1.9	57.55 +.26	50.9 −1.9
28.8	8.94 .28	19.2 0.4	9.79 .31	35.8 1.4	39 29.8 18.5	46.6 1.5	57.82 .29	49.2 1.4
Mar. 10.8	9.23 .29	19.5 −0.2	10.11 .33	34.7 0.9	39 48.9 19.4	45.3 1.0	58.12 .30	48.0 0.9
20.8	9.52 .29	19.6 0.0	10.44 .33	34.1 −0.3	40 8.6 19.9	44.6 +0.5	58.43 .31	47.4 −0.4
30.7	9.81 .29	19.4 +0.3	10.77 .34	34.1 +0.3	40 28.7 20.0	44.3 0.0	58.75 .32	47.3 +0.2
Apr. 9.7	10.11 +.29	19.1 +0.5	11.11 +.33	34.8 +0.9	40 48.6+19.7	44.5 −0.4	59.07 +.32	47.9 +0.8
19.7	10.40 .29	18.5 0.6	11.43 .32	35.9 1.4	41 8.0 18.9	45.1 0.9	59.39 .31	48.9 1.3
29.7	10.68 .28	17.8 0.8	11.74 .30	37.6 1.9	41 26.5 17.8	46.3 1.4	59.69 .29	50.4 1.7
May 9.6	10.94 .26	17.0 0.9	12.03 .27	39.7 2.3	41 43.7 16.4	47.8 1.8	59.97 .27	52.4 2.1
19.6	11.19 .24	16.0 1.0	12.29 .24	42.1 2.6	41 59.2 14.6	49.8 2.1	60.23 .25	54.7 2.4
29.6	11.42 +.21	15.1 +1.0	12.51 +.20	44.9 +2.8	42 12.7+12.4	52.1 −2.5	60.46 +.21	57.2 +2.6
June 8.5	11.62 .18	14.1 0.9	12.70 .16	47.8 2.9	42 24.0 9.9	54.8 2.8	60.66 .18	60.0 2.8
18.5	11.78 .15	13.2 0.9	12.84 .12	50.8 3.0	42 32.6 7.3	57.7 2.9	60.81 .13	62.8 2.8
28.5	11.91 .11	12.3 0.8	12.93 .07	53.7 3.0	42 38.5 4.4	60.7 3.1	60.92 .09	65.6 2.8
July 8.5	12.00 .07	11.5 0.7	12.97 +.02	56.7 2.9	42 41.5+ 1.4	63.8 3.1	60.99 +.04	68.4 2.7
18.4	12.04 +.02	10.9 +0.6	12.97 −.02	59.4 +2.7	42 41.4− 1.6	66.9 −3.1	61.01 −.01	71.1 +2.6
28.4	12.05 −.02	10.3 0.5	12.91 .06	62.0 2.4	42 38.3 4.5	70.0 2.9	60.97 .06	73.6 2.3
Aug. 7.4	12.01 .06	9.9 0.4	12.80 .13	64.3 2.1	42 32.3 7.4	72.8 2.7	60.90 .10	75.8 2.1
17.4	11.93 .09	9.6 0.3	12.65 .17	66.2 1.8	42 23.5 10.0	75.4 2.4	60.78 .14	77.7 1.8
27.3	11.82 .13	9.4 +0.2	12.46 .20	67.9 1.4	42 12.3 12.2	77.6 2.0	60.61 .18	79.3 1.4
Sept. 6.3	11.68 −.15	9.3 0.0	12.24 −.23	69.1 +1.0	41 59.1−14.1	79.4 −1.5	60.42 −.20	80.5 +1.0
16.3	11.52 .17	9.3 −0.1	12.00 .25	69.8 0.5	41 44.2 15.4	80.6 0.9	60.21 .22	81.4 0.6
26.2	11.35 .17	9.4 0.2	11.74 .26	70.2 +0.1	41 28.3 16.1	81.3 −0.4	59.98 .23	81.8 +0.2
Oct. 6.2	11.17 .17	9.6 0.2	11.48 .26	70.0 −0.4	41 12.0 16.2	81.4 +0.2	59.74 .23	81.7 −0.2
16.2	11.01 .16	9.9 0.3	11.23 .25	69.4 0.8	40 55.9 15.6	80.9 0.8	59.51 .22	81.3 0.7
26.2	10.86 −.14	10.3 −0.4	11.00 −.22	68.4 −1.3	40 40.8−14.4	79.8 +1.4	59.29 −.20	80.4 −1.1
Nov. 5.1	10.74 .10	10.7 0.5	10.79 .19	66.9 1.7	40 27.1 12.6	78.1 1.9	59.10 .18	79.1 1.5
15.1	10.65 .07	11.3 0.6	10.62 .15	64.9 2.1	40 15.6 10.2	75.9 2.4	58.94 .14	77.3 1.9
25.1	10.61 −.03	12.0 0.7	10.49 .10	62.6 2.5	40 6.7 7.4	73.4 2.8	58.82 .10	75.2 2.3
Dec. 5.1	10.60 +.02	12.8 0.8	10.41 −.05	59.9 2.8	40 0.8 4.4	70.4 3.1	58.75 −.05	72.7 2.6
15.0	10.65 +.07	13.6 −0.9	10.39 .00	56.9 −3.1	39 58.1− 1.1	67.2 +3.2	58.72 .00	70.0 −2.8
25.0	10.74 .11	14.6 1.0	10.41 +.05	53.8 3.2	39 58.8+ 2.3	63.9 3.3	58.74 +.05	67.1 3.0
35.0	10.86 +.15	15.6 −1.0	10.50 +.11	50.6 −3.3	40 2.8+ 5.7	60.6 +3.4	58.82 +.10	64.1 −3.0

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	σ Sagittarii.		50 Draconis.		ζ Aquilæ.		*d* Sagittarii.	
	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*
	h m 18 48	° ′ −26 25	h m 18 49	° ′ +75 17	h m 19 0	° ′ +13 41	h m 19 11	° ′ −19 8
	s	″	s	″	s	″	s	″
Jan. 0.0	20.25 +.13	61.0 +0.2	52.41 −.10	72.8 −3.6	16.27 +.08	57.4 −2.1	5.87 +.10	59.6 −0.2
10.0	20.40 .17	60.8 0.2	52.41 +.08	69.1 3.6	16.38 .12	55.2 2.1	5.99 .14	59.8 0.2
20.0	20.59 .21	60.6 0.2	52.57 .24	65.6 3.5	16.51 .16	53.1 2.0	6.14 .17	59.9 0.1
29.9	20.81 .24	60.4 0.2	52.89 .40	62.2 3.3	16.69 .19	51.2 1.9	6.33 .20	60.1 −0.1
Feb. 8.9	21.07 .27	60.2 0.2	53.36 .53	59.1 2.9	16.89 .22	49.4 1.7	6.55 .23	60.1 0.0
18.9	21.34 +.29	60.0 +0.2	53.96 +.66	56.3 −2.5	17.12 +.24	47.9 −1.3	6.80 +.25	60.1 0.0
28.8	21.64 .30	59.8 0.2	54.67 .75	54.1 1.9	17.37 .26	46.7 1.0	7.06 .27	60.0 +0.2
Mar. 10.8	21.95 .32	59.5 0.3	55.47 .82	52.5 1.3	17.63 .27	45.9 0.6	7.35 .29	59.8 0.3
20.8	22.27 .32	59.2 0.3	56.32 .87	51.5 −0.7	17.91 .28	45.5 −0.2	7.64 .30	59.5 0.4
30.8	22.60 .33	58.9 0.3	57.20 .88	51.2 0.0	18.20 .29	45.6 +0.2	7.95 .31	59.0 0.5
Apr. 9.7	22.93 +.33	58.5 +0.4	58.07 +.86	51.5 +0.6	18.49 +.29	46.0 +0.7	8.26 +.31	58.5 +0.6
19.7	23.25 .32	58.1 0.4	58.92 .82	52.5 1.3	18.78 .29	46.9 1.1	8.57 .31	57.8 0.6
29.7	23.57 .31	57.8 0.3	59.71 .75	54.0 1.8	19.06 .28	48.1 1.4	8.88 .31	57.1 0.7
May 9.7	23.88 .30	57.5 0.3	60.41 .66	56.1 2.3	19.34 .27	49.7 1.7	9.19 .30	56.4 0.7
19.6	24.17 .28	57.2 0.2	61.02 .54	58.6 2.7	19.59 .25	51.5 1.9	9.48 .28	55.7 0.7
29.6	24.44 +.25	57.0 +0.2	61.50 +.42	61.4 +3.0	19.83 +.22	53.4 +2.0	9.75 +.26	55.0 +0.7
June 8.6	24.68 .22	56.9 0.0	61.85 .28	64.6 3.2	20.04 .19	55.5 2.1	9.99 .23	54.4 0.6
18.5	24.89 .18	56.9 −0.1	62.06 +.14	67.8 3.3	20.21 .16	57.6 2.1	10.20 .20	53.9 0.5
28.5	25.05 .14	57.0 0.2	62.13 −.01	71.2 3.4	20.35 .12	59.7 2.1	10.38 .16	53.5 0.3
July 8.5	25.17 .10	57.2 0.3	62.04 .16	74.5 3.3	20.45 .08	61.8 2.0	10.52 .11	53.2 0.2
18.5	25.25 +.05	57.5 −0.4	61.80 −.30	77.8 +3.2	20.51 +.03	63.7 +1.9	10.61 +.07	53.1 +0.1
28.4	25.27 .00	58.0 0.4	61.43 .44	80.9 3.0	20.52 −.01	65.4 1.7	10.66 +.02	53.0 0.0
Aug. 7.4	25.25 −.04	58.4 0.5	60.93 .57	83.7 2.7	20.49 .05	67.0 1.4	10.66 −.02	53.1 −0.1
17.4	25.19 .09	58.9 0.5	60.30 .68	86.2 2.3	20.42 .09	68.3 1.2	10.61 .07	53.3 0.2
27.4	25.08 .13	59.4 0.5	59.57 .77	88.3 1.9	20.31 .12	69.4 0.9	10.53 .10	53.5 0.3
Sept. 6.3	24.94 −.15	59.9 −0.4	58.75 −.85	90.0 +1.5	20.17 −.15	70.2 +0.7	10.41 −.13	53.8 −0.3
16.3	24.77 .17	60.3 0.4	57.87 .91	91.3 1.0	20.00 .17	70.8 0.4	10.26 .16	54.1 0.3
26.3	24.59 .19	60.6 0.3	56.94 .94	92.1 +0.5	19.82 .18	71.0 +0.1	10.09 .17	54.4 0.3
Oct. 6.2	24.40 .19	60.9 0.2	55.99 .95	92.3 0.0	19.64 .18	71.0 −0.2	9.91 .18	54.7 0.3
16.2	24.21 .18	61.0 −0.1	55.04 .94	92.1 −0.6	19.46 .18	70.7 0.5	9.74 .17	55.0 0.3
26.2	24.05 −.15	61.1 0.0	54.11 −.90	91.2 −1.1	19.28 −.16	70.0 −0.8	9.57 −.15	55.3 −0.2
Nov. 5.2	23.91 .12	61.0 +0.1	53.24 .83	89.9 1.6	19.13 .14	69.1 1.1	9.43 .13	55.5 0.2
15.1	23.80 .08	60.9 0.1	52.45 .74	88.0 2.1	19.01 .11	67.9 1.3	9.32 .09	55.7 0.2
25.1	23.74 −.04	60.7 0.2	51.75 .63	85.6 2.6	18.93 .07	66.4 1.6	9.24 .05	55.9 0.2
Dec. 5.1	23.72 +.01	60.5 0.2	51.18 .50	82.9 3.0	18.88 −.02	64.7 1.8	9.21 −.01	56.1 0.2
15.1	23.75 +.06	60.3 +0.2	50.75 −.35	79.7 −3.3	18.87 +.02	62.8 −2.0	9.22 +.03	56.2 −0.2
25.0	23.84 .10	60.1 0.2	50.47 .20	76.3 3.5	18.91 .06	60.7 2.1	9.27 .08	56.4 0.2
35.0	23.96 +.14	59.9 +0.2	50.36 −.03	72.7 −3.6	18.99 +.10	58.6 −2.1	9.37 +.12	56.6 −0.2

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Draconis.		τ Draconis.		δ Aquilæ.		κ Aquilæ.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*
	h m 19 12	+67° 27′	h m 19 17	+73° 8′	h m 19 19	+ 2° 53′	h m 19 30	− 7° 16′
	s	″	s	″	s	″	s	″
Jan. 0.0	28.39 −.07	62.6 −3.6	37.13 −.15	61.6 −3.5	51.83 +.07	38.6 −1.5	52.82 +.07	25.9 −0.9
10.0	28.37 +.03	59.0 3.6	37.05 −.01	58.0 3.6	51.92 .11	37.1 1.5	52.91 .11	26.7 0.8
20.0	28.46 .14	55.4 3.5	37.11 +.13	54.4 3.5	52.05 .15	35.7 1.4	53.04 .14	27.6 0.8
29.9	28.65 .24	51.9 3.4	37.32 .27	50.9 3.4	52.21 .18	34.3 1.3	53.19 .17	28.3 0.7
Feb. 8.9	28.94 .34	48.7 3.0	37.65 .40	47.7 3.1	52.40 .20	33.1 1.1	53.38 .20	29.0 0.6
18.9	29.32 +.42	45.8 −2.6	38.11 +.51	44.8 −2.7	52.62 +.23	32.1 −0.9	53.59 +.23	29.5 −0.4
28.9	29.78 .49	43.4 2.1	38.68 .61	42.3 2.2	52.86 .25	31.3 0.6	53.83 .25	29.8 −0.2
Mar. 10.8	30.30 .54	41.6 1.5	39.34 .69	40.4 1.6	53.11 .26	30.8 −0.3	54.09 .26	29.8 0.0
20.8	30.87 .58	40.3 0.9	40.06 .74	39.0 1.0	53.38 .28	30.7 0.0	54.36 .28	29.7 +0.3
30.8	31.46 .60	39.8 −0.2	40.82 .77	38.4 −0.3	53.66 .29	30.9 +0.3	54.64 .29	29.3 0.5
Apr. 9.8	32.07 +.60	39.9 +0.4	41.59 +.77	38.3 +0.3	53.95 +.29	31.4 +0.7	54.93 +.29	28.7 +0.7
19.7	32.67 .59	40.6 1.0	42.36 .75	39.0 0.9	54.24 .29	32.2 1.0	55.23 .30	27.9 0.9
29.7	33.24 .55	41.9 1.6	43.09 .70	40.2 1.5	54.53 .29	33.3 1.2	55.53 .30	26.9 1.1
May 9.7	33.76 .50	43.8 2.1	43.77 .64	42.0 2.0	54.82 .28	34.6 1.4	55.82 .29	25.8 1.2
19.6	34.23 .44	46.2 2.6	44.37 .55	44.3 2.5	55.09 .26	36.1 1.6	56.11 .28	24.6 1.2
29.6	34.64 +.36	49.0 +2.9	44.87 +.45	47.0 +2.9	55.34 +.24	37.7 +1.6	56.37 +.26	23.4 +1.3
June 8.6	34.96 .28	52.1 3.2	45.27 .34	50.0 3.1	55.57 .21	39.3 1.7	56.62 .23	22.1 1.2
18.6	35.19 .18	55.4 3.4	45.56 .22	53.3 3.3	55.77 .18	41.0 1.7	56.83 .20	20.9 1.2
28.5	35.32 +.09	58.8 3.4	45.71 +.09	56.6 3.4	55.93 .15	42.7 1.6	57.01 .16	19.7 1.1
July 8.5	35.36 −.01	62.2 3.4	45.73 −.04	60.1 3.4	56.06 .11	44.2 1.5	57.16 .12	18.7 1.0
18.5	35.30 −.11	65.6 +3.3	45.63 −.17	63.5 +3.3	56.14 +.06	45.7 +1.4	57.26 +.08	17.8 +0.8
28.5	35.14 .21	68.8 3.1	45.40 .29	66.7 3.2	56.18 +.02	47.0 1.2	57.31 +.04	17.1 0.7
Aug. 7.4	34.88 .30	71.9 2.9	45.04 .41	69.8 2.9	56.18 −.02	48.1 1.0	57.33 −.01	16.5 0.5
17.4	34.54 .38	74.6 2.6	44.58 .52	72.6 2.6	56.13 .06	49.0 0.8	57.30 .05	16.0 0.4
27.4	34.13 .45	77.0 2.2	44.01 .61	75.1 2.3	56.05 .10	49.7 0.6	57.23 .09	15.7 0.2
Sept. 6.3	33.64 −.51	79.0 +1.8	43.35 −.69	77.2 +1.9	55.93 −.13	50.3 +0.4	57.12 −.12	15.6 +0.1
16.3	33.10 .56	80.6 1.3	42.63 .75	78.9 1.4	55.79 .15	50.6 +0.2	56.99 .15	15.6 −0.1
26.3	32.53 .59	81.6 0.8	41.85 .80	80.1 0.9	55.63 .17	50.7 0.0	56.83 .16	15.6 0.2
Oct. 6.3	31.93 .60	82.2 +0.3	41.03 .82	80.7 +0.4	55.46 .17	50.6 −0.2	56.66 .17	15.8 0.3
16.2	31.32 .60	82.2 −0.2	40.21 .82	80.9 −0.1	55.29 .17	50.4 0.4	56.50 .16	16.1 0.4
26.2	30.73 −.58	81.7 −0.8	39.40 −.80	80.5 −0.7	55.12 −.16	49.9 −0.6	56.34 −.15	16.5 −0.4
Nov. 5.2	30.16 .54	80.7 1.3	38.62 .75	79.5 1.2	54.98 .13	49.2 0.8	56.19 .13	17.0 0.5
15.2	29.65 .49	79.0 1.9	37.90 .69	78.1 1.8	54.86 .10	48.4 0.9	56.07 .10	17.6 0.6
25.1	29.19 .42	76.9 2.5	37.25 .60	76.0 2.3	54.78 .07	47.3 1.1	55.98 .07	18.2 0.7
Dec. 5.1	28.81 .33	74.3 2.8	36.70 .49	73.6 2.7	54.73 −.03	46.2 1.3	55.93 −.03	19.0 0.8
15.1	28.52 −.24	71.3 −3.1	36.26 −.38	70.7 −3.1	54.72 +.01	44.9 −1.4	55.92 +.01	19.8 −0.8
25.0	28.33 .14	68.0 3.4	35.95 .24	67.4 3.3	54.75 .05	43.4 1.5	55.95 .05	20.6 0.8
35.0	28.25 −.04	64.5 −3.6	35.75 −.10	64.0 −3.5	54.82 +.09	42.0 −1.5	56.02 +.09	21.4 −0.9

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Aquilæ.		α Aquilæ. (*Altair.*)		ε Draconis.		β Aquilæ.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m 19 40	° ′ +10 20	h m 19 45	° ′ + 8 34	h m 19 48	° ′ +69 58	h m 19 49	° ′ + 6 7
	s	″	s	″	s	″	s	″
Jan. 0.0	56.76 +.05	35.9 −1.8	19.86 +.04	32.3 −1.7	29.23 −.19	72.7 −3.3	49.45 +.04	47.5 −1.6
10.0	56.82 .08	34.1 1.8	19.92 .08	30.5 1.7	29.09 −.07	69.3 3.5	49.51 .08	45.9 1.6
20.0	56.92 .12	32.3 1.8	20.02 .12	28.8 1.7	29.07 +.04	65.8 3.5	49.61 .11	44.3 1.5
30.0	57.06 .15	30.5 1.7	20.15 .15	27.2 1.5	29.17 .16	62.2 3.4	49.73 .14	42.8 1.4
Feb. 8.9	57.23 .18	29.0 1.5	20.32 .18	25.8 1.4	29.39 .28	58.9 3.2	49.89 .17	41.5 1.3
18.9	57.42 +.21	27.6 −1.2	20.51 +.21	24.5 −1.1	29.72 +.38	55.8 −2.9	50.08 +.20	40.3 −1.0
28.9	57.64 .23	26.6 0.9	20.73 .23	23.6 0.8	30.15 .47	53.1 2.5	50.30 .22	39.5 0.7
Mar. 10.9	57.88 .25	25.9 0.5	20.97 .25	22.9 0.5	30.66 .55	50.9 2.0	50.53 .25	38.9 −0.4
20.8	58.14 .27	25.5 −0.1	21.23 .27	22.6 −0.1	31.24 .60	49.2 1.3	50.79 .26	38.7 0.0
30.8	58.42 .28	25.6 +0.2	21.50 .28	22.7 +0.3	31.87 .65	48.2 0.7	51.06 .28	38.8 +0.3
Apr. 9.8	58.71 +.29	26.0 +0.6	21.79 +.29	23.2 +0.6	32.53 +.66	47.8 −0.1	51.34 +.29	39.2 +0.6
19.7	59.00 .29	26.8 1.0	22.08 .29	24.0 1.0	33.19 .66	48.0 +0.6	51.63 .29	40.0 1.0
29.7	59.29 .29	28.0 1.3	22.37 .29	25.2 1.3	33.85 .64	48.9 1.2	51.93 .29	41.2 1.3
May 9.7	59.58 .28	29.4 1.6	22.66 .29	26.6 1.5	34.48 .60	50.4 1.8	52.22 .29	42.5 1.5
19.7	59.86 .27	31.1 1.8	22.95 .27	28.2 1.7	35.05 .54	52.4 2.3	52.50 .28	44.1 1.7
29.6	60.12 +.25	33.0 +1.9	23.21 +.26	30.1 +1.9	35.56 +.47	54.9 +2.6	52.77 +.26	45.9 +1.8
June 8.6	60.36 .23	35.0 2.0	23.46 .23	32.0 2.0	35.98 .38	57.8 3.0	53.02 .23	47.7 1.9
18.6	60.57 .19	37.0 2.1	23.67 .20	34.0 2.0	36.31 .28	60.9 3.3	53.24 .20	49.6 1.9
28.6	60.75 .16	39.1 2.0	23.86 .16	36.0 1.9	36.54 .18	64.3 3.4	53.42 .17	51.4 1.8
July 8.5	60.89 .12	41.0 1.9	24.00 .12	37.9 1.9	36.67 +.07	67.8 3.5	53.57 .13	53.2 1.7
18.5	60.98 +.07	42.9 +1.8	24.10 +.08	39.7 +1.8	36.68 −.04	71.2 +3.5	53.68 +.09	54.9 +1.6
28.5	61.04 +.03	44.7 1.7	24.16 +.04	41.4 1.6	36.59 .15	74.7 3.4	53.75 +.04	56.5 1.5
Aug. 7.4	61.05 −.01	46.2 1.5	24.18 −.01	42.9 1.4	36.38 .26	78.0 3.2	53.77 .00	57.8 1.3
17.4	61.01 .05	47.6 1.2	24.15 .05	44.2 1.2	36.08 .35	81.1 2.9	53.74 −.04	59.0 1.0
27.4	60.94 .09	48.7 1.0	24.08 .09	45.3 1.0	35.67 .44	83.9 2.6	53.68 .08	59.9 0.8
Sept. 6.4	60.83 −.12	49.6 +0.7	23.96 −.12	46.1 +0.7	35.19 −.52	86.3 +2.3	53.58 −.11	60.6 +0.6
16.3	60.69 .15	50.2 0.5	23.85 .15	46.7 0.5	34.64 .58	88.4 1.8	53.45 .14	61.1 0.4
26.3	60.53 .17	50.6 +0.2	23.69 .16	47.1 +0.2	34.03 .63	90.0 1.4	53.30 .16	61.4 +0.1
Oct. 6.3	60.35 .17	50.7 0.0	23.52 .17	47.1 0.0	33.36 .66	91.2 0.9	53.13 .17	61.4 −0.1
16.3	60.18 .17	50.5 −0.3	23.35 .17	47.0 −0.3	32.71 .67	91.8 +0.3	52.96 .17	61.3 0.3
26.2	60.01 −.16	50.1 −0.6	23.18 −.16	46.6 −0.5	32.03 −.67	91.9 −0.2	52.80 −.16	60.9 −0.5
Nov. 5.2	59.85 .15	49.4 0.8	23.03 .14	46.0 0.8	31.37 .64	91.4 0.8	52.64 .15	60.2 0.7
15.2	59.72 .12	48.5 1.1	22.90 .12	45.1 1.0	30.75 .60	90.3 1.3	52.51 .12	59.4 0.9
25.2	59.61 .09	47.3 1.3	22.79 .09	44.0 1.2	30.18 .54	88.7 1.9	52.41 .09	58.4 1.1
Dec. 5.1	59.54 .05	45.9 1.5	22.72 .05	42.7 -1.4	29.67 .46	86.6 2.4	52.34 .05	57.2 1.3
15.1	59.51 −.02	44.4 −1.6	22.69 −.01	41.2 −1.5	29.26 −.37	84.0 −2.8	52.30 −.02	55.8 −1.4
25.1	59.51 +.02	42.7 1.8	22.69 +.02	39.6 1.6	28.94 .26	81.0 3.1	52.30 +.02	54.3 1.5
35.0	59.55 +.06	40.8 −1.9	22.73 +.06	38.0 −1.7	28.73 −.15	77.7 −3.4	52.34 +.06	52.7 −1.6

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	τ Aquilæ.		α² Capricorni.		κ Cephei.		α Pavonis.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*
	h m	° ′	h m	° ′	h m	° ′	h m	° ′
	19 58	+ 6 57	20 11	−12 53	20 12	+77 22	20 16	−57 5
	s	″	s	″	s	″	s	″
Jan. 0.1	40.91 +.03	54.0 −1.6	51.40 +.04	21.4 −0.4	32.40 −.46	44.1 −3.1	48.21 +.02	31.3 +2.1
10.0	40.97 .07	52.4 1.6	51.46 .07	21.8 0.4	32.02 .29	40.8 3.3	48.26 .09	29.1 2.2
20.0	41.05 .10	50.8 1.5	51.54 .11	22.2 0.3	31.83 −.10	37.4 3.4	48.39 .15	26.8 2.3
30.0	41.17 .14	49.3 1.5	51.67 .14	22.4 0.2	31.82 +.09	34.0 3.4	48.57 .22	24.5 2.3
Feb. 9.0	41.32 .17	48.0 1.3	51.82 .17	22.6 −0.1	32.01 .28	30.5 3.3	48.82 .27	22.1 2.3
18.9	41.50 +.19	46.8 −1.0	52.00 +.20	22.7 0.0	32.38 +.45	27.3 −3.1	49.12 +.33	19.8 +2.2
28.9	41.71 .22	45.9 0.7	52.21 .22	22.5 +0.2	32.92 .61	24.4 2.7	49.47 .37	17.7 2.1
Mar. 10.9	41.94 .24	45.3 0.4	52.45 .24	22.2 0.4	33.60 .75	21.9 2.2	49.87 .42	15.6 2.0
20.8	42.19 .26	45.1 −0.1	52.70 .26	21.8 0.6	34.42 .86	20.0 1.7	50.31 .45	13.7 1.8
30.8	42.46 .27	45.2 +0.3	52.97 .28	21.1 0.8	35.32 .94	18.6 1.1	50.77 .48	12.1 1.6
Apr. 9.8	42.74 +.28	45.7 +0.6	53.26 +.30	20.3 +0.9	36.29 +.99	17.8 −0.4	51.26 +.50	10.6 +1.3
19.8	43.03 .29	46.5 1.0	53.56 .30	19.3 1.1	37.29 1.00	17.7 +0.2	51.76 .52	9.5 1.0
29.7	43.33 .29	47.6 1.3	53.87 .31	18.2 1.2	38.29 .98	18.2 0.8	52.29 .52	8.7 0.7
May 9.7	43.62 .29	49.0 1.5	54.18 .31	17.0 1.2	39.25 .93	19.3 1.4	52.82 .52	8.2 +0.3
19.7	43.90 .28	50.6 1.7	54.48 .30	15.7 1.2	40.14 .85	21.0 1.9	53.33 .50	8.0 0.0
29.7	44.18 +.27	52.4 +1.8	54.78 +.29	14.5 +1.2	40.94 +.74	23.1 +2.4	53.82 +.48	8.2 −0.4
June 8.6	44.43 .24	54.3 1.9	55.05 .26	13.3 1.2	41.62 .61	25.7 2.8	54.28 .44	8.8 0.7
18.6	44.66 .21	56.3 1.9	55.31 .24	12.2 1.1	42.16 .47	28.7 3.1	54.70 .39	9.7 1.0
28.6	44.85 .18	58.2 1.9	55.53 .20	11.2 0.9	42.55 .31	31.9 3.3	55.07 .34	10.9 1.3
July 8.5	45.01 .14	60.1 1.8	55.71 .16	10.3 0.8	42.78 +.15	35.3 3.4	55.37 .27	12.4 1.6
18.5	45.12 +.10	61.8 +1.7	55.86 +.12	9.6 +0.6	42.84 −.02	38.8 +3.5	55.61 +.20	14.1 −1.8
28.5	45.20 .05	63.4 1.5	55.96 .08	9.1 0.5	42.74 .19	42.3 3.5	55.77 .12	16.0 2.0
Aug. 7.5	45.22 +.01	64.9 1.4	56.01 +.03	8.7 0.3	42.46 .35	45.7 3.4	55.85 +.04	18.1 2.1
17.4	45.21 −.04	66.1 1.1	56.02 −.01	8.5 +0.2	42.03 .51	49.0 3.2	55.86 −.03	20.2 2.1
27.4	45.15 .08	67.2 0.9	55.98 .06	8.5 0.0	41.45 .65	52.0 2.9	55.78 .10	22.2 2.0
Sept. 6.4	45.06 −.11	68.0 +0.7	55.91 −.09	8.6 −0.1	40.73 −.77	54.8 +2.6	55.64 −.18	24.2 −1.9
16.4	44.93 .14	68.5 0.5	55.80 .12	8.7 0.2	39.90 .88	57.2 2.2	55.43 .23	26.0 1.7
26.3	44.78 .16	68.9 +0.2	55.66 .15	9.0 0.3	38.97 .97	59.3 1.8	55.18 .27	27.5 1.4
Oct. 6.3	44.62 .17	69.0 0.0	55.51 .16	9.4 0.4	37.96 1.03	60.8 1.3	54.88 .30	28.7 1.0
16.3	44.45 .17	68.8 −0.2	55.34 .16	9.8 0.4	36.90 1.07	61.9 0.8	54.57 .32	29.6 0.6
26.2	44.28 −.16	68.5 −0.5	55.18 −.16	10.2 −0.4	35.82 −1.08	62.5 +0.3	54.25 −.31	30.0 −0.2
Nov. 5.2	44.13 .15	67.9 0.7	55.03 .14	10.7 0.5	34.74 1.07	62.4 −0.3	53.94 .29	30.0 +0.2
15.2	43.99 .12	67.1 0.9	54.90 .12	11.1 0.5	33.69 1.02	61.8 0.9	53.66 .26	29.6 0.6
25.2	43.88 .09	66.1 1.1	54.79 .09	11.6 0.5	32.70 .95	60.7 1.4	53.42 .21	28.8 1.0
Dec. 5.1	43.81 .06	64.9 1.3	54.72 .06	12.1 0.5	31.79 .84	59.0 2.0	53.24 .15	27.6 1.4
15.1	43.76 −.03	63.5 −1.4	54.68 −.02	12.6 −0.5	31.00 −.72	56.8 −2.4	53.12 −.09	26.0 +1.7
25.1	43.76 +.01	62.0 1.5	54.67 +.02	13.0 0.4	30.35 .57	54.1 2.8	53.06 −.02	24.2 2.0
35.1	43.79 +.05	60.5 −1.6	54.70 +.05	13.4 −0.4	29.86 −.41	51.1 −3.2	53.08 +.05	22.1 +2.1

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Cygni.		π Capricorni.		ε Delphini.		Groombridge 3241.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m 20 18	° ′ +39 53	h m 20 20	° ′ −18 34	h m 20 27	° ′ +10 55	h m 20 30	° ′ +72 9
	s	″	s	″	s	″	s	″
Jan. 0.1	12.63 −.05	69.7 −2.7	55.66 +.03	34.9 −0.1	52.54 .00	35.1 −1.7	25.52 −.35	28.0 −3.0
10.0	12.61 .00	66.9 2.9	55.71 .07	35.0 0.0	52.55 +.04	33.4 1.7	25.23 .22	24.9 3.2
20.0	12.64 +.05	63.9 3.0	55.79 .10	35.0 +0.1	52.61 .07	31.7 1.7	25.07 −.09	21.5 3.4
30.0	12.71 .10	60.9 2.9	55.91 .13	34.8 0.2	52.69 .10	30.0 1.6	25.04 +.04	18.1 3.5
Feb. 9.0	12.83 .14	58.1 2.7	56.06 .16	34.6 0.3	52.82 .13	28.5 1.4	25.14 .17	14.6 3.4
18.9	13.00 +.18	55.5 −2.4	56.24 +.19	34.3 +0.4	52.97 +.17	27.2 −1.2	25.38 +.29	11.4 −3.2
28.9	13.20 .23	53.2 2.1	56.45 .22	33.9 0.5	53.15 .20	26.1 0.9	25.73 .41	8.4 2.8
Mar. 10.9	13.45 .26	51.4 1.6	56.68 .25	33.3 0.7	53.36 .22	25.4 0.6	26.20 .51	5.8 2.4
20.9	13.72 .29	50.0 1.1	56.94 .27	32.5 0.8	53.59 .24	25.0 −0.2	26.76 .60	3.7 1.8
30.8	14.03 .32	49.2 −0.5	57.21 .29	31.7 0.9	53.84 .26	25.0 +0.2	27.40 .67	2.1 1.2
Apr. 9.8	14.35 +.33	49.0 0.0	57.51 +.30	30.7 +1.0	54.12 +.28	25.3 +0.6	28.09 +.71	1.2 −0.6
19.8	14.69 .34	49.3 +0.6	57.82 .31	29.6 1.1	54.40 .29	26.1 0.9	28.82 .73	0.9 0.0
29.7	15.04 .35	50.2 1.2	58.13 .32	28.5 1.2	54.70 .30	27.2 1.2	29.55 .73	1.3 +0.7
May 9.7	15.38 .34	51.6 1.7	58.45 .32	27.3 1.2	55.00 .30	28.6 1.5	30.28 .71	2.2 1.3
19.7	15.72 .33	53.5 2.1	58.77 .31	26.1 1.1	55.30 .29	30.2 1.8	30.96 .66	3.8 1.8
29.7	16.03 +.30	55.8 +2.5	59.07 +.30	25.0 +1.1	55.58 +.28	32.1 +2.0	31.59 +.59	5.8 +2.3
June 8.6	16.32 .27	58.4 2.7	59.36 .28	24.0 1.0	55.85 .26	34.1 2.1	32.15 .51	8.4 2.7
18.6	16.57 .23	61.3 3.0	59.63 .25	23.1 0.8	56.10 .23	36.3 2.1	32.61 .41	11.3 3.1
28.6	16.78 .19	64.4 3.1	59.87 .22	22.3 0.7	56.31 .20	38.4 2.1	32.97 .30	14.5 3.3
July 8.6	16.95 .14	67.5 3.1	60.07 .18	21.7 0.5	56.49 .16	40.6 2.1	33.22 .19	17.9 3.5
18.5	17.06 +.09	70.6 +3.1	60.22 +.14	21.3 +0.3	56.63 +.12	42.6 +2.0	33.35 +.07	21.4 +3.5
28.5	17.12 +.04	73.7 3.0	60.34 .09	21.1 +0.1	56.73 .07	44.5 1.8	33.37 −.05	25.0 3.5
Aug. 7.5	17.13 −.02	76.6 2.9	60.40 +.04	21.1 −0.1	56.78 +.03	46.2 1.6	33.25 .17	28.5 3.5
17.4	17.09 .07	79.4 2.6	60.42 .00	21.2 0.2	56.79 −.01	47.8 1.4	33.03 .29	31.9 3.3
27.4	16.99 .12	81.9 2.3	60.39 −.05	21.4 0.3	56.75 .05	49.1 1.2	32.69 .39	35.1 3.1
Sept. 6.4	16.85 −.16	84.0 +2.0	60.32 −.09	21.8 −0.4	56.68 −.09	50.2 +1.0	32.24 −.50	38.0 +2.8
16.4	16.67 .20	85.9 1.6	60.22 .12	22.2 0.4	56.57 .12	51.0 0.7	31.71 .57	40.6 2.4
26.3	16.46 .22	87.3 1.2	60.08 .14	22.7 0.5	56.43 .15	51.6 0.5	31.10 .64	42.8 2.0
Oct. 6.3	16.23 .24	88.3 0.8	59.93 .16	23.2 0.5	56.28 .16	51.9 +0.2	30.43 .69	44.6 1.5
16.3	15.98 .25	88.9 +0.3	59.76 .16	23.8 0.5	56.11 .16	51.9 −0.1	29.72 .73	45.9 1.0
26.2	15.74 −.25	89.0 −0.1	59.60 −.16	24.2 −0.5	55.95 −.16	51.7 −0.3	28.98 −.74	46.6 +0.5
Nov. 5.2	15.49 .24	88.6 0.6	59.44 .15	24.7 0.4	55.79 .15	51.2 0.6	28.24 .73	46.8 −0.1
15.2	15.27 .21	87.8 1.1	59.31 .12	25.1 0.4	55.64 .14	50.5 0.8	27.51 .71	46.5 0.7
25.2	15.07 .19	86.5 1.5	59.19 .10	25.4 0.3	55.52 .11	49.5 1.1	26.82 .66	45.5 1.2
Dec. 5.1	14.90 .15	84.7 2.0	59.11 .07	25.7 0.2	55.42 .08	48.4 1.3	26.18 .60	44.0 1.8
15.1	14.77 −.11	82.6 −2.3	59.06 −.03	25.9 −0.2	55.35 −.05	47.0 −1.5	25.62 −.51	41.9 −2.3
25.1	14.67 .07	80.1 2.6	59.06 +.01	26.0 −0.1	55.32 −.02	45.4 1.6	25.15 .41	39.3 2.7
35.1	14.63 −.03	77.3 −2.8	59.08 +.03	26.1 0.0	55.32 +.02	43.8 −1.7	24.79 −.31	36.4 −3.1

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Cygni.		μ Aquarii.		12 Year Cat. 1879.		ν Cygni.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m 20 37	° ′ +44 52	h m 20 46	° ′ − 9 23	h m 20 52	° ′ +80 7	h m 20 52	° ′ +40 44
	s	″	s	″	s	″	s	″
Jan. 0.1	36.76 −.08	67.0 −2.7	37.81 .00	62.4 −0.6	31.38 −.82	77.6 −2.7	60.06 −.08	28.9 −2.5
10.1	36.70 −.03	64.1 2.9	37.83 +.04	62.9 0.5	30.67 .60	74.7 3.0	60.00 −.04	26.2 2.8
20.0	36.69 +.02	61.1 3.1	37.88 .07	63.4 0.5	30.18 .37	71.5 3.3	59.98 +.01	23.4 2.9
30.0	36.73 .07	58.0 3.0	37.97 .10	63.8 0.3	29.93 −.13	68.2 3.4	60.01 .05	20.5 2.9
Feb. 9.0	36.83 .12	55.0 2.9	38.08 .13	64.1 −0.2	29.92 +.11	64.8 3.4	60.09 .10	17.6 2.8
19.0	36.97 +.17	52.2 −2.6	38.23 +.16	64.3 0.0	30.15 +.35	61.4 −3.3	60.21 +.15	15.0 −2.5
28.9	37.16 .22	49.7 2.3	38.40 .19	64.2 +0.2	30.61 .57	58.3 3.0	60.38 .19	12.6 2.2
Mar. 10.9	37.40 .26	47.6 1.9	38.60 .22	63.9 0.4	31.29 .78	55.5 2.6	60.59 .23	10.5 1.8
20.9	37.68 .29	46.0 1.4	38.83 .24	63.4 0.6	32.16 .95	53.1 2.1	60.84 .27	9.0 1.3
30.8	37.98 .32	45.0 0.8	39.08 .26	62.8 0.8	33.19 1.09	51.3 1.6	61.12 .30	7.9 0.8
Apr. 9.8	38.32 +.35	44.5 −0.2	39.35 +.28	61.8 +1.0	34.34+1.18	50.0 −1.0	61.43 +.32	7.4 −0.2
19.8	38.68 .36	44.5 +0.4	39.64 .29	60.8 1.2	35.56 1.24	49.3 −0.4	61.77 .34	7.4 +0.3
29.8	39.04 .37	45.2 0.9	39.94 .30	59.5 1.3	36.81 1.25	49.2 +0.3	62.12 .35	8.0 0.9
May 9.7	39.41 .36	46.4 1.5	40.25 .31	58.2 1.4	38.05 1.22	49.8 0.9	62.47 .35	9.2 1.4
19.7	39.77 .35	48.2 2.0	40.55 .31	56.7 1.5	39.24 1.15	51.0 1.5	62.82 .34	10.8 1.9
29.7	40.11 +.33	50.4 +2.4	40.86 +.30	55.2 +1.5	40.35+1.04	52.7 +2.0	63.16 +.33	12.9 +2.3
June 8.6	40.43 .30	52.9 2.7	41.15 .28	53.7 1.5	41.34 .91	54.9 2.4	63.47 .30	15.4 2.6
18.6	40.71 .26	55.8 3.0	41.42 .26	52.3 1.4	42.17 .75	57.5 2.8	63.76 .27	18.1 2.9
28.6	40.95 .22	58.9 3.2	41.66 .23	51.0 1.3	42.83 .58	60.5 3.1	64.01 .23	21.1 3.0
July 8.6	41.14 .17	62.1 3.3	41.87 .19	49.8 1.1	43.31 .37	63.7 3.3	64.21 .18	24.2 3.1
18.5	41.28 +.11	65.4 +3.3	42.04 +.15	48.8 +0.9	43.58 +.17	67.2 +3.5	64.37 +.13	27.4 +3.2
28.5	41.36 +.05	68.6 3.2	42.17 .11	48.0 0.7	43.64 −.04	70.7 3.5	64.47 .08	30.5 3.1
Aug. 7.5	41.38 .00	71.8 3.1	42.26 .06	47.3 0.5	43.49 .25	74.3 3.5	64.52 +.02	33.6 3.0
17.5	41.35 −.06	74.8 2.9	42.30 +.01	46.9 0.4	43.14 .45	77.8 3.5	64.52 −.03	36.5 2.9
27.4	41.26 .12	77.6 2.6	42.29 −.02	46.6 +0.2	42.59 .64	81.1 3.3	64.46 .08	39.3 2.6
Sept. 6.4	41.12 −.16	80.0 +2.3	42.24 −.06	46.5 0.0	41.86 −.82	84.3 +3.0	64.36 −.13	41.7 +2.3
16.4	40.94 .20	82.2 2.0	42.16 .10	46.6 −0.1	40.96 .97	87.2 2.7	64.21 .17	43.8 2.0
26.3	40.73 .23	83.9 1.6	42.04 .13	46.7 0.2	39.91 1.11	89.8 2.4	64.03 .20	45.6 1.6
Oct. 6.3	40.48 .25	85.3 1.1	41.91 .14	47.0 0.3	38.74 1.22	91.9 1.8	63.82 .22	47.0 1.2
16.3	40.22 .27	86.2 0.6	41.76 .15	47.4 0.4	37.48 1.30	93.7 1.5	63.59 .23	47.9 0.7
26.3	39.95 −.27	86.6 +0.2	41.60 −.15	47.9 −0.5	36.14−1.35	94.9 +1.0	63.35 −.24	48.5 +0.3
Nov. 5.2	39.68 .26	86.5 −0.3	41.46 .14	48.4 0.5	34.77 1.37	95.5 +0.4	63.11 .24	48.5 −0.2
15.2	39.43 .24	85.9 0.9	41.32 .13	49.0 0.6	33.40 1.36	95.6 −0.2	62.88 .22	48.0 0.7
25.2	39.19 .22	84.8 1.3	41.20 .10	49.5 0.6	32.06 1.31	95.2 0.8	62.66 .20	47.1 1.2
Dec. 5.2	38.99 .19	83.2 1.8	41.11 .08	50.1 0.6	30.80 1.22	94.1 1.4	62.47 .18	45.6 1.6
15.1	38.81 −.15	81.2 −2.2	41.04 −.05	50.7 −0.6	29.64−1.09	92.4 −1.9	62.31 −.14	43.8 −2.0
25.1	38.68 .11	78.7 2.6	41.01 −.01	51.3 0.6	28.63 .92	90.3 2.4	62.19 .10	41.6 2.4
35.1	38.60 −.06	76.0 −2.8	41.01 +.02	51.9 −0.5	27.79− .74	87.7 −2.8	62.10 −.06	39.1 −2.6

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	61¹ Cygni.		ζ Cygni.		α Cephei.		1 Pegasi.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	$21^h\ 1^m$	$+38^\circ\ 11'$	$21^h\ 8^m$	$+29^\circ\ 46'$	$21^h\ 15^m$	$+62^\circ\ 6'$	$21^h\ 16^m$	$+19^\circ\ 19'$
	s	″	s	″	s	″	s	″
Jan. 0.1	53.30 −.08	78.1 −2.4	10.77 −.06	21.5 −2.1	53.50 −.25	63.9 −2.5	55.26 −.05	48.2 −1.7
10.1	53.24 −.03	75.6 2.5	10.72 −.02	19.2 2.3	53.28 .19	61.1 2.9	55.22 −.02	46.3 1.9
20.0	53.23 +.01	73.0 2.6	10.71 +.01	16.8 2.4	53.13 .11	58.0 3.2	55.22 +.02	44.4 1.9
30.0	53.26 .05	70.3 2.7	10.74 .05	14.4 2.4	53.05 −.03	54.8 3.3	55.25 .05	42.5 1.9
Feb. 9.0	53.34 .10	67.7 2.6	10.81 .09	12.0 2.3	53.06 +.05	51.5 3.3	55.32 .08	40.6 1.8
19.0	53.46 +.14	65.2 −2.4	10.91 +.12	9.8 −2.1	53.15 +.13	48.2 −3.1	55.42 +.12	38.9 −1.6
28.9	53.63 .18	63.0 2.0	11.05 .16	7.8 1.8	53.33 .21	45.2 2.9	55.55 .15	37.4 1.3
Mar. 10.9	53.83 .22	61.1 1.7	11.23 .20	6.1 1.4	53.58 .29	42.5 2.5	55.72 .18	36.3 1.0
20.9	54.08 .26	59.6 1.2	11.45 .23	4.9 1.0	53.90 .35	40.1 2.1	55.92 .21	35.4 0.6
30.9	54.36 .29	58.7 0.7	11.70 .26	4.1 −0.5	54.29 .41	38.3 1.5	56.15 .24	35.0 −0.2
Apr. 9.8	54.66 +.32	58.2 −0.1	11.97 +.29	3.8 0.0	54.72 +.46	37.1 −0.9	56.40 +.27	35.0 +0.2
19.8	54.99 .34	58.3 +0.4	12.27 .30	4.0 +0.4	55.20 .49	36.4 −0.3	56.68 .29	35.5 0.6
29.8	55.34 .35	59.0 0.9	12.57 .32	4.7 0.9	55.71 .51	36.4 +0.3	56.97 .30	36.3 1.1
May 9.7	55.69 .35	60.2 1.4	12.90 .32	5.9 1.4	56.22 .51	37.0 0.9	57.28 .31	37.6 1.4
19.7	56.05 .35	61.9 1.9	13.23 .32	7.5 1.8	56.73 .50	38.2 1.5	57.59 .31	39.2 1.8
29.7	56.39 +.34	64.0 +2.3	13.55 +.31	9.4 +2.1	57.22 +.48	39.9 +2.0	57.90 +.30	41.1 +2.0
June 8.7	56.72 .31	66.5 2.6	13.85 .29	11.7 2.4	57.68 .44	42.1 2.4	58.19 .29	43.3 2.2
18.6	57.01 .28	69.3 2.9	14.13 .27	14.3 2.6	58.10 .39	44.8 2.8	58.47 .27	45.6 2.4
28.6	57.28 .24	72.2 3.1	14.38 .23	17.0 2.8	58.46 .32	47.8 3.1	58.73 .24	48.1 2.5
July 8.6	57.50 .20	75.4 3.2	14.59 .19	19.8 2.8	58.75 .26	51.1 3.4	58.94 .20	50.6 2.5
18.6	57.68 +.15	78.6 +3.2	14.77 +.15	22.7 +2.8	58.97 +.18	54.5 +3.5	59.13 +.16	53.0 +2.4
28.5	57.80 .10	81.8 3.1	14.89 .10	25.5 2.8	59.10 .10	58.1 3.6	59.27 .12	55.4 2.3
Aug. 7.5	57.88 +.05	84.9 3.0	14.97 .05	28.2 2.7	59.16 +.02	61.7 3.6	59.36 .07	57.7 2.2
17.5	57.90 .00	87.8 2.9	15.00 +.01	30.8 2.5	59.14 −.06	65.2 3.5	59.41 +.02	59.8 2.0
27.4	57.87 −.05	90.6 2.6	14.98 −.04	33.1 2.3	59.04 .14	68.6 3.3	59.41 −.02	61.7 1.8
Sept. 6.4	57.79 −.10	93.1 +2.4	14.92 −.08	35.2 +2.0	58.86 −.21	71.8 +3.0	59.37 −.06	63.4 +1.5
16.4	57.67 .14	95.3 2.1	14.82 .12	37.0 1.7	58.62 .27	74.7 2.7	59.30 .09	64.8 1.3
26.4	57.52 .17	97.2 1.7	14.68 .15	38.6 1.3	58.32 .33	77.3 2.4	59.19 .12	65.9 1.0
Oct. 6.3	57.33 .19	98.6 1.3	14.52 .17	39.7 1.0	57.96 .37	79.4 2.0	59.05 .14	66.7 0.7
16.3	57.13 .21	99.7 0.8	14.34 .19	40.5 0.6	57.57 .40	81.2 1.5	58.90 .16	67.3 +0.4
26.3	56.91 −.22	100.3 +0.4	14.15 −.19	40.9 +0.2	57.16 −.43	82.4 +1.0	58.74 −.16	67.5 0.0
Nov. 5.3	56.70 .21	100.5 −0.1	13.96 .19	40.9 −0.2	56.72 .44	83.1 +0.4	58.57 .16	67.3 −0.3
15.2	56.49 .20	100.2 0.5	13.77 .18	40.5 0.6	56.29 .43	83.3 −0.1	58.41 .15	66.9 0.6
25.2	56.29 .18	99.4 1.0	13.60 .17	39.6 1.0	55.86 .41	82.8 0.7	58.27 .14	66.1 0.9
Dec. 5.2	56.12 .16	98.2 1.4	13.45 .14	38.4 1.4	55.46 .38	81.8 1.3	58.14 .12	65.1 1.2
15.1	55.98 −.13	96.6 −1.8	13.32 −.11	36.9 −1.7	55.10 −.34	80.3 −1.8	58.03 −.09	63.7 −1.4
25.1	55.86 .09	94.6 −2.2	13.22 .08	35.0 2.0	54.78 .29	78.2 2.3	57.95 .07	62.2 1.7
35.1	55.79 −.06	92.3 −2.5	13.16 −.05	32.9 −2.2	54.52 −.23	75.7 −2.7	57.90 −.04	60.4 −1.9

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**β Aquarii.**		**β Cephei.**		**ξ Aquarii.**		**ε Pegasi.**	
	Right Ascension.	**Declination *South.***	**Right Ascension.**	**Declination *North.***	**Right Ascension.**	**Declination *South.***	**Right Ascension.**	**Declination *North.***
	$21^{h}\ 25^{m}$	$-6°\ 3'$	$21^{h}\ 27^{m}$	$+70°\ 4'$	$21^{h}\ 31^{m}$	$-8°\ 20'$	$21^{h}\ 38^{m}$	$+9°\ 21'$
	s	″	s	″	s	″	s	″
Jan. 0.1	40.91 −.03	38.4 −0.7	10.86 −.41	34.2 −2.4	48.57 −.03	72.2 −0.6	42.22 −.04	57.0 −1.4
10.1	40.90 .00	39.1 0.6	10.49 .32	31.5 2.8	48.55 −.01	72.7 0.5	42.18 −.03	55.6 1.4
20.1	40.91 +.03	39.7 0.6	10.22 .22	28.6 3.1	48.56 +.02	73.2 0.4	42.17 .00	54.2 1.4
30.0	40.95 .06	40.2 0.5	10.05 −.11	25.3 3.3	48.60 .05	73.5 0.3	42.19 +.03	52.9 1.3
Feb. 9.0	41.02 .09	40.6 0.3	9.99 .00	22.0 3.3	48.66 .08	73.8 −0.2	42.24 .07	51.6 1.2
19.0	41.13 +.12	40.8 −0.1	10.05 +.12	18.6 −3.3	48.76 +.11	73.8 0.0	42.32 +.10	50.5 −1.0
28.9	41.26 .15	40.9 +0.1	10.23 .23	15.5 3.1	48.89 .15	73.7 +0.2	42.44 .13	49.6 0.8
Mar. 10.9	41.43 .18	40.7 0.3	10.52 .34	12.5 2.7	49.05 .18	73.4 0.4	42.58 .16	48.9 0.5
20.9	41.62 .21	40.2 0.5	10.91 .44	10.0 2.3	49.24 .20	72.8 0.7	42.76 .19	48.6 −0.2
30.9	41.84 .23	39.6 0.8	11.39 .52	7.9 1.8	49.46 .23	72.0 0.9	42.97 .22	48.6 +0.2
Apr. 9.8	42.09 +.26	38.6 +1.0	11.95 +.59	6.4 −1.2	49.71 +.26	71.0 +1.1	43.21 +.25	48.9 +0.5
19.8	42.36 .28	37.5 1.2	12.57 .64	5.5 −0.6	49.98 .28	69.8 1.3	43.47 .27	49.6 0 9
29.8	42.65 .30	36.2 1.4	13.22 .66	5.1 0.0	50.26 .29	68.4 1.5	43.75 .29	50.6 1.2
May 9.8	42.95 .31	34.7 1.6	13.90 .67	5.4 +0.6	50.56 .31	66.9 1.6	44.04 .30	52.0 1.5
19.7	43.26 .31	33.1 1.7	14.56 .66	6.4 1.2	50.88 .31	65.3 1.7	44.35 .31	53.6 1.7
29.7	43.56 +.30	31.4 +1.7	15.21 +.63	7.9 +1.8	51.19 +.31	63.6 +1.7	44.66 +.30	55.4 +1.9
June 8.7	43.87 .29	29.7 1.7	15.82 .57	9.9 2.3	51.49 .30	61.9 1.6	44.96 .29	57.4 2.0
18.6	44.15 .28	28.0 1.6	16.36 .51	12.4 2.7	51.78 .28	60.3 1.6	45.24 .28	59.5 2.1
28.6	44.42 .25	26.4 1.5	16.83 .43	15.2 3.0	52.06 .26	58.8 1.5	45.51 .25	61.6 2.1
July 8.6	44.65 .22	25.0 1.4	17.21 .33	18.4 3.3	52.30 .23	57.4 1.3	45.75 .22	63.8 2.1
18.6	44.86 +.18	23.6 +1.2	17.50 +.23	21.9 +3.5	52.51 +.19	56.2 +1.1	45.95 +.18	65.8 +2.0
28.5	45.02 .14	22.5 1.0	17.68 .13	25.4 3.6	52.68 .15	55.1 0.9	46.11 .14	67.8 1.9
Aug. 7.5	45.14 .10	21.5 0.8	17.75 +.02	29.1 3.6	52.80 .10	54.3 0.7	46.24 .10	69.6 1.8
17.5	45.21 .05	20.8 0.6	17.72 −.09	32.7 3.6	52.88 .06	53.7 0.5	46.31 .06	71.3 1.5
27.5	45.24 +.01	20.3 0.4	17.58 .19	36.2 3.5	52.92 +.02	53.3 0.3	46.35 +.01	72.7 1.3
Sept. 6.4	45.23 −.03	20.0 +0.2	17.35 −.28	39.6 +3.3	52.91 −.03	53.1 +0.1	46.34 −.03	73.9 +1.1
16.4	45.18 .07	19.8 0.0	17.02 .38	42.7 3.0	52.87 .06	53.1 −0.1	46.29 .06	74.9 0.8
26.4	45.09 .10	19.9 −0.1	16.60 .45	45.6 2.7	52.79 .09	53.2 0.2	46.21 .09	75.6 0.6
Oct. 6.3	44.98 .12	20.1 0.3	16.12 .51	48.1 2.2	52.68 .12	53.5 0.3	46.10 .12	76.1 0.4
16.3	44.85 .14	20.4 0.4	15.58 .57	50.1 1.8	52.55 .13	53.9 0.4	45.97 .13	76.4 +0.1
26.3	44.71 −.14	20.8 −0.5	14.99 −.60	51.6 +1.3	52.42 −.14	54.4 −0.5	45.83 −.14	76.4 −0.1
Nov. 5.3	44.56 .14	21.3 0.6	14.37 .62	52.7 0.7	52.27 .14	55.0 0.6	45.69 .14	76.2 0.3
15.2	44.43 .13	21.9 0.6	13.75 .62	53.1 +0.2	52.14 .13	55.6 0.6	45.54 .14	75.7 0.6
25.2	44.30 .12	22.5 0.7	13.13 .61	53.0 −0.4	52.01 .12	56.2 0.6	45.41 .13	75.0 0.8
Dec. 5.2	44.19 .10	23.2 0.7	12.53 .58	52.2 1.0	51.90 .10	56.8 0.6	45.29 .11	74.2 0.9
15.2	44.11 −.07	23.9 −0.7	11.97 −.53	50.9 −1.6	51.81 −.08	57.4 −0.6	45.19 −.09	73.2 −1.1
25.1	44.05 .05	24.6 0.7	11.47 .46	49.1 2.1	51.75 .05	58.0 0.6	45.11 .07	72.0 1.2
35.1	44.01 −.02	25.3 −0.7	11.05 −.38	46.8 −2.6	51.71 −.02	58.6 −0.5	45.06 −.04	70.7 −1.3

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	11 Cephei.		μ Capricorni.		79 Draconis.		α Aquarii.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*
	h m 21 40	° ′ +70 47	h m 21 47	° ′ −14 4	h m 21 51	° ′ +73 10	h m 22 0	° ′ − 0 51
	s	″	s	″	s	″	s	″
Jan. 0.1	15.16 −.46	71.8 −2.2	12.63 −.05	34.5 −0.3	26.27 −.56	49.0 −2.2	3.14 −.06	37.1 −0.9
10.1	14.75 .37	69.4 2.7	12.60 −.02	34.8 0.2	25.76 .46	46.6 2.6	3.09 .03	37.9 0.8
20.1	14.42 .27	66.5 3.0	12.60 +.01	34.9 −0.1	25.35 .35	43.8 2.9	3.07 −.01	38.7 0.8
30.0	14.21 .16	63.3 3.2	12.62 .04	34.9 +0.1	25.06 .23	40.8 3.1	3.08 +.02	39.5 0.7
Feb. 9.0	14.11 −.04	60.0 3.3	12.68 .07	34.7 0.2	24.90 −.09	37.5 3.3	3.11 .05	40.1 0.6
19.0	14.14 +.08	56.7 −3.3	12.77 +.10	34.4 +0.4	24.87 +.05	34.2 −3.3	3.18 +.08	40.6 −0.4
Mar. 1.0	14.28 .20	53.5 3.1	12.89 .13	33.9 0.6	24.99 .19	31.0 3.2	3.27 .11	40.8 −0.2
10.9	14.54 .32	50.5 2.8	13.03 .16	33.2 0.8	25.25 .32	27.9 2.9	3.40 .14	40.9 +0.1
20.9	14.92 .42	47.9 2.4	13.22 .20	32.3 1.0	25.63 .44	25.1 2.5	3.56 .18	40.7 0.3
30.9	15.39 .52	45.7 1.9	13.43 .23	31.2 1.2	26.13 .55	22.8 2.1	3.75 .21	40.2 0.6
Apr. 9.9	15.95 +.59	44.0 −1.4	13.67 +.25	29.9 +1.4	26.73 +.64	21.0 −1.5	3.98 +.24	39.4 +0.9
19.8	16.57 .64	42.9 0.8	13.93 .28	28.5 1.5	27.41 .71	19.7 1.0	4.22 .26	38.4 1.1
29.8	17.24 .68	42.5 −0.2	14.22 .30	27.0 1.6	28.15 .76	19.0 −0.4	4.50 .28	37.1 1.4
May 9.8	17.93 .69	42.6 +0.4	14.52 .31	25.3 1.7	28.92 .78	19.0 +0.2	4.79 .30	35.6 1.6
19.7	18.62 .69	43.3 1.0	14.84 .32	23.6 1.7	29.70 .78	19.6 0.9	5.09 .31	34.0 1.7
29.7	19.30 +.66	44.7 +1.6	15.16 +.32	22.0 +1.6	30.47 +.75	20.7 +1.4	5.40 +.31	32.2 +1.8
June 8.7	19.94 .61	46.6 2.1	15.48 .31	20.4 1.6	31.20 .70	22.4 2.0	5.71 .30	30.3 1.9
18.7	20.53 .55	48.9 2.6	15.78 .30	18.8 1.5	31.87 .63	24.6 2.4	6.01 .29	28.4 1.9
28.6	21.04 .47	51.7 2.9	16.07 .27	17.4 1.3	32.46 .54	27.3 2.8	6.28 .27	26.5 1.8
July 8.6	21.46 .38	54.8 3.3	16.33 .24	16.2 1.1	32.95 .44	30.3 3.2	6.54 .24	24.7 1.7
18.6	21.79 +.28	58.2 +3.5	16.55 +.21	15.2 +0.9	33.34 +.33	33.6 +3.4	6.76 +.21	23.1 +1.6
28.6	22.01 .17	61.7 3.6	16.74 .17	14.5 0.7	33.62 .22	37.1 3.6	6.95 .17	21.6 1.4
Aug. 7.5	22.13 +.06	65.3 3.7	16.89 .12	13.9 0.4	33.78 +.10	40.7 3.7	7.10 .13	20.2 1.2
17.5	22.14 −.05	69.0 3.6	16.99 .08	13.6 +0.2	33.81 −.03	44.4 3.7	7.20 .08	19.1 1.0
27.5	22.03 .16	72.6 3.5	17.04 +.03	13.5 0.0	33.72 .15	48.1 3.6	7.26 +.04	18.2 0.8
Sept. 6.4	21.82 −.26	76.1 +3.4	17.05 −.01	13.7 −0.2	33.51 −.26	51.6 +3.5	7.28 .00	17.6 +0.6
16.4	21.52 .35	79.3 3.1	17.02 .05	13.9 0.3	33.20 .37	55.0 3.2	7.26 −.04	17.1 0.3
26.4	21.12 .43	82.3 2.8	16.95 .08	14.4 0.5	32.77 .47	58.1 2.9	7.20 .07	16.9 +0.1
Oct. 6.4	20.65 .50	84.9 2.4	16.85 .11	14.9 0.6	32.26 .55	60.9 2.6	7.12 .10	16.8 0.0
16.3	20.11 .56	87.2 2.0	16.74 .13	15.5 0.6	31.67 .62	63.3 2.2	7.00 .12	16.9 −0.2
26.3	19.52 −.61	88.9 +1.5	16.60 −.14	16.2 −0.7	31.01 −.68	65.2 +1.7	6.88 −.13	17.2 −0.3
Nov. 5.3	18.90 .63	90.1 0.9	16.46 .14	16.9 0.7	30.31 .72	66.7 1.2	6.75 .13	17.6 0.5
15.3	18.26 .64	90.8 +0.4	16.32 .13	17.5 0.6	29.58 .73	67.6 +0.6	6.62 .13	18.2 0.6
25.2	17.62 .63	90.9 −0.2	16.19 .12	18.1 0.6	28.84 .73	67.9 0.0	6.49 .12	18.8 0.7
Dec. 5.2	16.99 .61	90.4 0.8	16.08 .10	18.7 0.5	28.12 .71	67.6 −0.6	6.37 .11	19.5 0.7
15.2	16.40 −.56	89.3 −1.4	15.98 −.08	19.2 −0.4	27.42 −.67	66.6 −1.2	6.27 −.09	20.3 −0.8
25.1	15.87 .49	87.5 2.0	15.91 .06	19.6 0.3	26.78 .61	65.2 1.8	6.19 .07	21.1 0.8
35.1	15.40 −.43	85.3 −2.5	15.87 −.04	19.9 −0.2	26.21 −.53	63.1 −2.3	6.13 −.05	21.9 −0.8

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Gruis.		θ Aquarii.		π Aquarii.		η Aquarii.	
	Right Ascension.	Declination *South.*	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*
	22h 1m	−47° 29′	22h 10m	− 8° 19′	22h 19m	+ 0° 48′	22h 29m	− 0° 41′
	s	″	s	″	s	″	s	″
Jan. 0.1	11.38 −.10	69.0 +1.2	56.74 −.06	76.3 −0.6	34.79 −.07	46.4 −0.9	37.46 −.08	27.9 −0.8
10.1	11.30 .06	67.7 1.5	56.69 .04	76.9 0.5	34.73 .05	45.5 0.9	37.40 .06	28.7 0.8
20.1	11.26 −.02	66.0 1.8	56.66 −.01	77.3 0.4	34.69 −.03	44.7 0.8	37.35 .03	29.4 0.7
30.1	11.26 +.02	64.1 2.0	56.66 +.02	77.6 0.2	34.68 .00	43.9 0.7	37.33 −.01	30.1 0.6
Feb. 9.0	11.31 .07	61.9 2.3	56.69 .04	77.7 −0.1	34.69 +.03	43.2 0.6	37.34 +.02	30.7 0.5
19.0	11.40 +.12	59.6 +2.4	56.75 +.07	77.7 +0.1	34.74 +.06	42.7 −0.4	37.38 +.05	31.1 −0.3
Mar. 1.0	11.54 .16	57.2 2.5	56.84 .11	77.5 0.3	34.82 .09	42.4 −0.2	37.44 .08	31.4 −0.1
11.0	11.73 .21	54.7 2.5	56.96 .14	77.1 0.5	34.92 .12	42.2 0.0	37.54 .12	31.4 +0.1
20.9	11.96 .25	52.2 2.5	57.12 .17	76.4 0.8	35.07 .16	42.4 +0.3	37.67 .15	31.2 0.4
30.9	12.23 .29	49.6 2.5	57.30 .20	75.6 1.0	35.24 .19	42.8 0.6	37.84 .18	30.7 0.6
Apr. 9.9	12.54 +.33	47.2 +2.4	57.52 +.23	74.4 +1.2	35.45 +.22	43.5 +0.8	38.04 +.21	29.9 +0.9
19.8	12.89 .36	44.9 2.2	57.76 .26	73.1 1.4	35.68 .25	44.5 1.1	38.27 .24	28.8 1.2
29.8	13.26 .39	42.8 2.0	58.03 .28	71.6 1.6	35.95 .27	45.7 1.4	38.53 .27	27.5 1.4
May 9.8	13.67 .41	40.9 1.8	58.32 .30	70.0 1.7	36.23 .29	47.2 1.6	38.81 .29	26.0 1.6
19.8	14.09 .43	39.3 1.5	58.63 .31	68.3 1.8	36.53 .30	48.8 1.7	39.11 .30	24.4 1.8
29.7	14.52 +.43	38.0 +1.2	58.94 +.31	66.5 +1.8	36.84 +.31	50.7 +1.9	39.42 +.31	22.5 +1.9
June 8.7	14.95 .42	37.0 0.8	59.26 .31	64.6 1.8	37.15 .31	52.6 1.9	39.73 .31	20.6 1.9
18.7	15.37 .41	36.4 +0.4	59.56 .30	62.9 1.7	37.45 .30	54.5 2.0	40.03 .30	18.6 1.9
28.7	15.76 .38	36.2 0.0	59.86 .28	61.2 1.6	37.74 .28	56.5 1.9	40.32 .28	16.7 1.9
July 8.6	16.12 .34	36.4 −0.4	60.12 .25	59.7 1.5	38.01 .25	58.4 1.8	40.60 .26	14.9 1.8
18.6	16.45 +.30	37.0 −0.7	60.36 +.22	58.3 +1.2	38.24 +.22	60.2 +1.7	40.84 +.23	13.1 +1.7
28.6	16.72 .24	37.9 1.1	60.56 .18	57.2 1.0	38.44 .18	61.8 1.5	41.05 .19	11.5 1.5
Aug. 7.5	16.93 .18	39.1 1.4	60.72 .14	56.2 0.8	38.61 .14	63.2 1.3	41.22 .15	10.1 1.3
17.5	17.08 .12	40.7 1.6	60.84 .10	55.5 0.6	38.73 .10	64.5 1.1	41.36 .11	9.0 1.1
27.5	17.17 +.06	42.4 1.8	60.92 .05	55.1 0.4	38.81 .06	65.5 0.9	41.44 .07	8.0 0.8
Sept. 6.5	17.20 −.01	44.3 −1.9	60.95 +.01	54.8 +0.1	38.84 +.02	66.3 +0.7	41.49 +.03	7.3 +0.6
16.4	17.16 .06	46.3 2.0	60.94 −.03	54.8 −0.1	38.84 −.02	66.9 0.5	41.50 −.01	6.8 0.4
26.4	17.07 .12	48.3 1.9	60.89 .06	54.9 0.2	38.80 .06	67.2 0.3	41.47 .05	6.5 +0.2
Oct. 6.4	16.93 .16	50.2 1.8	60.82 .09	55.2 0.4	38.73 .08	67.4 +0.1	41.41 .08	6.4 0.0
16.4	16.75 .19	51.8 1.6	60.71 .11	55.6 0.5	38.63 .10	67.4 −0.1	41.32 .10	6.5 −0.2
26.3	16.55 −.21	53.3 −1.3	60.60 −.12	56.2 −0.6	38.52 −.12	67.2 −0.3	41.21 −.11	6.8 −0.3
Nov. 5.3	16.33 .22	54.4 1.0	60.47 .13	56.8 0.6	38.40 .13	66.8 0.4	41.10 .12	7.2 0.5
15.3	16.10 .22	55.2 0.6	60.34 .13	57.4 0.7	38.27 .13	66.3 0.5	40.97 .12	7.7 0.6
25.2	15.89 .21	55.6 −0.2	60.21 .12	58.1 0.7	38.14 .12	65.7 0.7	40.85 .12	8.3 0.7
Dec. 5.2	15.69 .19	55.6 +0.2	60.09 .11	58.8 0.6	38.02 .11	65.0 0.8	40.73 .11	9.0 0.7
15.2	15.51 −.16	55.2 +0.6	59.99 −.09	59.4 −0.6	37.92 −.10	64.2 −0.8	40.62 −.10	9.8 −0.8
25.2	15.37 .12	54.4 1.0	59.91 .07	60.0 0.6	37.83 .08	63.4 0.8	40.53 .08	10.5 0.8
35.1	15.26 −.09	53.2 +1.3	59.84 −.05	60.5 −0.5	37.76 −.06	62.5 −0.8	40.45 −.06	11.3 −0.8

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	226 Cephei (B.)		ζ Pegasi.		ι Cephei.		λ Aquarii.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *South.*
	h m 22 30	° ′ +75 38	h m 22 35	° ′ +10 14	h m 22 45	° ′ +65 36	h m 22 46	° ′ - 8 9
	s	″	s	″	s	″	s	″
Jan. 0.2	17.13 -.74	87.9 -1.6	53.98 -.09	64.8 -1.1	41.99 -.41	70.8 -1.5	47.78 -.09	80.9 -0.6
10.1	16.43 .65	86.1 2.1	53.91 .07	63.6 1.2	41.60 .35	69.1 2.0	47.71 .06	81.4 0.5
20.1	15.83 .54	83.7 2.5	53.85 .05	62.4 1.2	41.26 .30	66.8 2.4	47.65 .04	81.8 0.3
30.1	15.35 .41	81.0 2.9	53.82 -.02	61.2 1.2	40.98 .24	64.2 2.8	47.62 -.02	82.1 -0.2
Feb. 9.1	15.01 .26	78.0 3.1	33.81 +.01	60.0 1.1	40.79 .16	61.3 3.0	47.61 +.01	82.2 0.0
19.0	14.82 -.10	74.8 -3.2	53.84 +.04	59.0 -1.0	40.68 -.07	58.2 -3.1	47.64 +.04	82.1 +0.2
Mar. 1.0	14.80 +.06	71.5 3.2	53.89 .07	58.1 0.8	40.65 +.03	55.1 3.1	47.69 .07	81.8 0.4
11.0	14.94 .22	68.3 3.1	53.98 .11	57.4 0.5	40.73 .12	52.1 2.9	47.77 .10	81.4 0.6
20.9	15.25 .38	65.3 2.9	54.10 .14	57.0 -0.2	40.90 .22	49.2 2.7	47.89 .14	80.7 0.8
30.9	15.70 .52	62.7 2.4	54.26 .18	56.9 +0.1	41.17 .31	46.7 2.3	48.04 .17	79.7 1.1
Apr. 9.9	16.29 +.65	60.5 -2.0	54.46 +.21	57.2 +0.4	41.52 +.39	44.6 -1.9	48.23 +.20	78.6 +1.3
19.9	16.99 .75	58.7 1.5	54.69 .24	57.7 0.7	41.94 .46	43.0 1.4	48.45 .24	77.2 1.5
29.8	17.79 .83	57.6 0.9	54.95 .27	58.6 1.1	42.43 .51	41.9 0.8	48.70 .26	75.6 1.6
May 9.8	18.65 .88	57.0 -0.3	55.23 .29	59.9 1.4	42.97 .55	41.4 -0.2	48.98 .29	73.9 1.8
19.8	19.54 .90	57.0 +0.3	55.52 .30	61.4 1.6	43.54 .58	41.4 +0.4	49.27 .30	72.1 1.9
29.8	20.44 +.89	57.6 +0.9	55.83 +.31	63.1 +1.8	44.12 +.58	42.1 +0.9	49.58 +.31	70.2 +1.9
June 8.7	21.32 .86	58.8 1.5	56.15 .31	65.1 2.0	44.70 .57	43.3 1.5	49.90 .32	68.2 1.9
18.7	22.16 .80	60.6 2.0	56.45 .30	67.2 2.1	45.26 .54	45.1 2.0	50.21 .31	66.4 1.8
28.7	22.93 .72	62.8 2.5	56.75 .29	69.3 2.2	45.79 .50	47.3 2.4	50.52 .30	64.6 1.7
July 8.6	23.61 .62	65.5 2.9	57.02 .26	71.5 2.2	46.26 .45	49.9 2.8	50.80 .27	62.9 1.6
18.6	24.18 +.51	68.6 +3.2	57.26 +.23	73.7 +2.1	46.68 +.38	52.9 +3.1	51.06 +.24	61.4 +1.4
28.6	24.63 .39	71.9 3.4	57.48 .19	75.7 2.0	47.02 .31	56.2 3.4	51.29 .21	60.1 1.2
Aug. 7.6	24.95 .25	75.4 3.6	57.65 .15	77.7 1.9	47.29 .23	59.7 3.5	51.48 .17	59.1 0.9
17.5	25.13 +.12	79.1 3.7	57.78 .11	79.5 1.7	47.48 .14	63.3 3.6	51.64 .13	58.3 0.7
27.5	25.18 -.02	82.8 3.7	57.87 .07	81.1 1.5	47.58 +.06	66.9 3.6	51.74 .09	57.8 0.4
Sept. 6.5	25.10 -.16	86.5 +3.7	57.92 +.03	82.4 +1.3	47.59 -.03	70.5 +3.6	51.81 +.05	57.5 +0.2
16.5	24.87 .29	90.2 3.5	57.93 -.01	83.6 1.0	47.52 .11	74.0 3.4	51.84 +.01	57.4 0.0
26.4	24.52 .41	93.6 3.3	57.90 .04	84.5 0.8	47.37 .18	77.4 3.2	51.82 -.03	57.5 -0.2
Oct. 6.4	24.06 .52	96.8 3.0	57.84 .07	85.2 0.5	47.15 .25	80.5 2.9	51.78 .06	57.8 0.4
16.4	23.48 .62	99.7 2.7	57.76 .10	85.6 0.3	46.87 .31	83.3 2.6	51.70 .09	58.3 0.5
26.3	22.82 -.70	102.1 +2.2	57.65 -.12	85.8 +0.1	46.53 -.37	85.7 +2.2	51.60 -.11	58.8 -0.6
Nov. 5.3	22.08 .77	104.1 1.7	57.53 .12	85.8 -0.1	46.14 .41	87.6 1.7	51.49 .12	59.5 0.7
15.3	21.28 .82	105.6 1.2	57.40 .13	85.5 0.4	45.72 .44	89.0 1.2	51.38 .12	60.2 0.7
25.3	20.44 .85	106.6 +0.6	57.27 .13	85.0 0.6	45.27 .45	90.0 +0.6	51.26 .12	60.9 0.7
Dec. 5.2	19.58 .05	106.9 0.0	57.15 .12	84.4 0.7	44.81 .46	90.3 0.0	51.14 .11	61.6 0.7
15.2	18.74 -.83	106.6 -0.6	57.03 -.11	83.6 -0.9	44.35 -.45	90.0 -0.6	51.03 -.10	62.2 -0.6
25.2	17.93 .78	105.7 1.2	56.93 .09	82.6 1.0	43.91 .43	89.2 1.1	50.93 .09	62.8 0.6
35.2	17.18 -.71	104.2 -1.8	56.85 -.07	81.5 -1.1	43.49 -.40	87.8 -1.7	50.85 -.08	63.4 -0.5

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Piscis Australis. (*Fomalhaut.*)		α Pegasi. (*Markab.*)		ο Cephei.		θ Piscium.	
	Right Ascension.	Declination *South.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m 22 51	° ′ −30 12	h m 22 59	° ′ +14 36	h m 23 14	° ′ +67 29	h m 23 22	° ′ + 5 45
	s	″	s	″	s	″	s	″
Jan. 0.2	29.08 −.10	52.5 +0.2	12.46 −.10	27.4 −1.1	2.79 −.47	87.2 −1.0	18.87 −.10	64.1 −0.9
10.2	28.98 .08	52.2 0.5	12.36 .09	26.2 1.2	2.33 .44	85.8 1.6	18.77 .09	63.2 0.9
20.1	28.92 .05	51.6 0.8	12.28 .07	24.9 1.3	1.92 .38	84.0 2.1	18.69 .08	62.3 0.9
30.1	28.87 −.03	50.7 1.0	12.23 .04	23.6 1.3	1.56 .32	81.6 2.5	18.62 .06	61.4 0.8
Feb. 9.1	28.86 .00	49.5 1.3	12.20 −.02	22.3 1.3	1.29 .24	78.9 2.8	18.58 −.03	60.6 0.8
19.0	28.88 +.04	48.1 +1.5	12.19 +.01	21.0 −1.2	1.09 −.14	76.0 −3.0	18.56 .00	59.9 −0.6
Mar. 1.0	28.94 .07	46.5 1.7	12.22 .05	19.9 1.0	1.00 −.04	72.9 3.1	18.57 +.03	59.4 0.5
11.0	29.03 .11	44.7 1.9	12.29 .08	19.0 0.8	1.01 +.06	69.9 3.0	18.61 .06	59.0 −0.3
20.9	29.15 .15	42.8 2.0	12.39 .12	18.4 0.5	1.12 .17	66.9 2.9	18.69 .10	58.9 0.0
30.9	29.32 .19	40.7 2.1	12.53 .16	18.0 −0.2	1.34 .27	64.2 2.6	18.81 .14	59.1 +0.3
Apr. 9.9	29.52 +.22	38.5 +2.2	12.70 +.19	18.0 +0.2	1.66 +.36	61.9 −2.1	18.96 +.17	59.5 +0.6
19.9	29.77 .26	36.3 2.2	12.92 .23	18.4 0.5	2.06 .44	60.0 1.7	19.15 .21	60.2 0.9
29.8	30.04 .29	34.0 2.2	13.16 .26	19.1 0.9	2.55 .51	58.6 1.2	19.38 .24	61.3 1.2
May 9.8	30.34 .32	31.8 2.2	13.43 .28	20.1 1.2	3.09 .57	57.7 −0.6	19.63 .27	62.6 1.4
19.8	30.67 .34	29.7 2.0	13.73 .30	21.4 1.5	3.69 .60	57.4 0.0	19.91 .29	64.1 1.6
29.8	31.01 +.35	27.7 +1.9	14.03 +.31	23.1 +1.8	4.30 +.62	57.7 +0.6	20.21 +.30	65.8 +1.8
June 8.7	31.37 .35	26.0 1.7	14.35 .32	24.9 2.0	4.93 .62	58.5 1.1	20.52 .31	67.8 2.0
18.7	31.72 .35	24.4 1.4	14.67 .31	27.0 2.1	5.55 .61	59.9 1.6	20.83 .31	69.8 2.0
28.7	32.06 .33	23.2 1.1	14.97 .30	29.2 2.2	6.14 .58	61.8 2.2	21.14 .30	71.8 2.1
July 8.7	32.39 .31	22.3 0.8	15.26 .28	31.5 2.3	6.69 .52	64.2 2.6	21.43 .29	73.9 2.1
18.6	32.69 +.28	21.7 +0.4	15.52 +.25	33.7 +2.3	7.19 +.46	66.9 +2.9	21.71 +.26	76.0 +2.0
28.6	32.95 .24	21.4 +0.1	15.75 .21	36.0 2.2	7.61 .39	70.0 3.2	21.95 .23	77.8 1.8
Aug. 7.6	33.17 .20	21.5 −0.3	15.94 .17	38.1 2.1	7.96 .31	73.3 3.4	22.17 .20	79.6 1.7
17.6	33.35 .15	21.9 0.6	16.10 .13	40.2 1.9	8.23 .22	76.9 3.6	22.34 .16	81.2 1.5
27.5	33.48 .11	22.7 0.9	16.21 .09	42.0 1.7	8.41 .14	80.5 3.6	22.48 .12	82.6 1.3
Sept. 6.5	33.57 +.06	23.7 −1.1	16.28 +.05	43.7 +1.5	8.50 +.04	84.2 +3.7	22.58 +.08	83.8 +1.1
16.5	33.60 +.01	24.9 1.3	16.31 +.01	45.1 1.3	8.50 −.04	87.8 3.6	22.63 +.04	84.8 0.8
26.4	33.59 −.03	26.2 1.4	16.30 −.02	46.3 1.1	8.42 .12	91.3 3.4	22.65 .00	85.4 0.6
Oct. 6.4	33.54 .07	27.6 1.4	16.26 .05	47.2 0.8	8.25 .20	94.6 3.2	22.64 −.03	85.9 0.4
16.4	33.45 .10	29.1 1.4	16.20 .08	48.0 0.6	8.01 .27	97.7 2.9	22.59 .06	86.2 +0.2
26.4	33.34 −.12	30.5 −1.3	16.10 −.10	48.4 +0.3	7.71 −.34	100.4 +2.5	22.52 −.08	86.3 0.0
Nov. 5.3	33.20 .14	31.8 1.2	16.00 .11	48.6 +0.1	7.34 .39	102.7 2.1	22.44 .09	86.1 −0.2
15.3	33.06 .15	32.9 1.0	15.88 .12	48.5 −0.2	6.92 .44	104.6 1.6	22.34 .11	85.8 0.4
25.3	32.91 .15	33.8 0.8	15.75 .13	48.2 0.4	6.46 .47	105.9 1.1	22.22 .11	85.4 0.5
Dec. 5.3	32.77 .14	34.4 0.5	15.63 .12	47.7 0.6	5.98 .49	106.7 +0.5	22.11 .11	84.8 0.6
15.2	32.63 −.13	34.8 −0.2	15.50 −.12	47.0 −0.8	5.49 −.49	106.9 −0.1	22.00 −.11	84.1 −0.7
25.2	32.51 .11	34.9 0.0	15.39 .11	46.1 1.0	5.00 .49	106.4 0.7	21.89 .10	83.4 0.8
35.2	32.41 −.09	34.8 +0.3	15.29 −.10	45.0 −1.1	4.52 −.47	105.4 −1.2	21.79 −.10	82.5 −0.9

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ι Piscium.		γ Cephei.		Groombridge 4163.		ω Piscium.	
	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*	Right Ascension.	Declination *North.*
	h m 23 34	° ′ + 5 1	h m 23 34	° ′ +77 0	h m 23 49	° ′ +73 47	h m 23 53	° ′ + 6 14
	s	″	s	″	s	″	s	″
Jan. 0.2	13.16 −.11	23.4 −0.8	46.23 −.90	58.9 −0.6	25.30 −.70	46.0 −0.5	35.50 −.11	50.1 −0.8
10.2	13.06 .09	22.6 0.9	45.35 .85	58.0 1.2	24.60 .68	45.2 1.1	35.39 .10	49.2 0.8
20.2	12.97 .08	21.7 0.8	44.53 .77	56.4 1.8	23.94 .62	43.8 1.6	35.29 .09	48.4 0.8
30.1	12.90 .06	20.9 0.8	43.81 .66	54.4 2.3	23.35 .55	41.9 2.1	35.20 .08	47.6 0.8
Feb. 9.1	12.85 .04	20.1 0.7	43.20 .53	51.9 2.7	22.84 .45	39.6 2.5	35.13 .06	46.8 0.7
19.1	12.82 −.01	19.5 −0.6	42.74 −.38	49.1 −2.9	22.45 −.33	36.8 −2.8	35.09 −.03	46.2 −0.6
Mar. 1.1	12.82 +.02	19.0 0.4	42.44 .21	46.0 3.1	22.18 .20	33.9 3.0	35.07 .00	45.7 0.5
11.0	12.85 .05	18.7 −0.2	42.33 −.02	42.9 3.1	22.05 −.06	30.8 3.1	35.08 +.03	45.3 −0.2
21.0	12.92 .09	18.6 +0.1	42.39 +.16	39.8 3.0	22.07 +.09	27.8 3.0	35.12 .07	45.2 0.0
30.9	13.02 .12	18.8 0.3	42.64 .34	36.8 2.8	22.23 .24	24.8 2.8	35.21 .11	45.3 +0.3
Apr. 9.9	13.16 +.16	19.3 +0.6	43.06 +.50	34.1 −2.5	22.54 +.37	22.1 −2.5	35.34 +.14	45.7 +0.5
19.9	13.35 .20	20.0 0.9	43.64 .65	31.8 2.1	22.98 .50	19.8 2.1	35.50 .18	46.4 0.8
29.9	13.56 .23	21.1 1.2	44.36 .78	30.0 1.6	23.54 .61	17.9 1.7	35.70 .22	47.4 1.1
May 9.9	13.81 .26	22.4 1.4	45.19 .88	28.6 1.1	24.20 .70	16.4 1.2	35.94 .25	48.6 1.3
19.8	14.09 .29	23.9 1.6	46.11 .95	27.8 −0.5	24.94 .77	15.6 −0.6	36.20 .28	50.1 1.6
29.8	14.38 +.30	25.6 +1.8	47.08 +.99	27.6 +0.1	25.73 +.81	15.2 0.0	36.49 +.30	51.8 +1.8
June 8.8	14.69 .31	27.6 2.0	48.08 1.00	28.0 0.6	26.55 .83	15.5 +0.5	36.80 .31	53.6 1.9
18.7	15.01 .31	29.5 2.0	49.08 .98	28.9 1.2	27.38 .82	16.3 1.1	37.11 .31	55.6 2.0
28.7	15.32 .30	31.6 2.1	50.04 .94	30.4 1.7	28.20 .80	17.7 1.6	37.42 .31	57.7 2.1
July 8.7	15.62 .29	33.6 2.0	50.95 .87	32.4 2.2	28.98 .75	19.6 2.1	37.73 .30	59.8 2.1
18.7	15.90 +.27	35.6 +1.9	51.77 +.78	34.8 +2.6	29.69 +.68	21.9 +2.5	38.02 +.28	61.8 +2.0
28.6	16.15 .24	37.5 1.8	52.50 .67	37.7 3.0	30.34 .60	24.7 2.9	38.28 .25	63.7 1.9
Aug. 7.6	16.38 .21	39.3 1.7	53.11 .55	40.8 3.3	30.89 .50	27.7 3.2	38.52 .22	65.5 1.7
17.6	16.56 .17	40.8 1.5	53.60 .42	44.3 3.6	31.35 .40	31.1 3.4	38.72 .19	67.2 1.5
27.6	16.71 .13	42.2 1.2	53.94 .28	47.9 3.7	31.69 .29	34.6 3.6	38.89 .15	68.6 1.3
Sept. 6.5	16.82 +.09	43.3 +1.0	54.15 +.13	51.6 +3.8	31.93 +.18	38.3 +3.7	39.02 +.11	69.8 +1.1
16.5	16.89 .05	44.2 0.8	54.21 −.01	55.4 3.8	32.05 +.06	42.0 3.7	39.10 .07	70.8 0.9
26.5	16.92 +.02	44.9 0.6	54.12 .15	59.2 3.7	32.05 −.05	45.8 3.7	39.16 +.03	71.6 0.6
Oct. 6.4	16.92 −.02	45.3 0.3	53.90 .29	62.8 3.6	31.94 .17	49.4 3.5	39.17 .00	72.1 0.4
16.4	16.89 .04	45.5 +0.1	53.54 .42	66.2 3.3	31.72 .27	52.8 3.3	39.16 −.03	72.4 +0.2
26.4	16.83 −.07	45.6 −0.1	53.05 −.54	69.4 +3.0	31.39 −.37	56.0 +3.0	39.12 −.05	72.5 0.0
Nov. 5.4	16.75 .09	45.4 0.2	52.45 .66	72.2 2.6	30.97 .47	58.8 2.6	39.06 .07	72.4 −0.2
15.3	16.66 .10	45.1 0.4	51.74 .75	74.5 2.1	30.46 .55	61.2 2.2	38.97 .09	72.2 0.3
25.3	16.56 .11	44.6 0.5	50.95 .82	76.4 1.6	29.87 .61	63.2 1.7	38.88 .10	71.8 0.5
Dec. 5.3	16.45 .11	44.0 0.6	50.10 .88	77.7 1.0	29.23 .66	64.6 1.1	38.78 .11	71.3 0.6
15.3	16.34 −.11	43.4 −0.7	49.19 −.91	78.4 +0.4	28.55 −.70	65.4 +0.5	38.67 −.11	70.7 −0.7
25.2	16.23 .11	42.6 0.8	48.28 .91	78.5 −0.2	27.84 .71	65.6 −0.1	38.56 .11	70.0 0.7
35.2	16.12 −.10	41.8 −0.9	47.38 −.88	78.0 −0.8	27.13 −.69	65.2 −0.7	38.45 −.10	69.2 −0.8

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Cassiop.	22 Androm.	σ Androm.	ι Ceti.	6 Urs. Min., S. P.	44 Piscium.	π Androm.	o Cassiop.
	31° 28′	44° 33′	53° 50′	99° 26′	358° 19′	88° 41′	56° 54′	42° 19′
	h m	h m	h m	h m	h m	h m	h m	h m
	0 3	0 4	0 12	0 13	0 13	0 19	0 30	0 38
	s	s	s	s	s	s	s	s
(Dec. 30.2)	14.50 − .34	32.21 − .23	30.82 − .17	45.02 − .10	75.68 +7.78	41.68 − .12	56.30 − .20	31.71 − .24
Jan. 9.2	14.17 .32	31.99 .21	30.65 .16	44.92 .10	83.44 7.64	41.56 .11	56.11 .17	31.47 .24
19.2	13.87 .30	31.79 .19	30.49 .16	44.82 .10	90.96 7.26	41.47 .09	55.95 .15	31.23 .23
29.1	13.58 − .28	31.61 − .17	30.33 − .16	44.73 − .09	97.95 +6.57	41.38 − .08	55.80 − .14	31.01 − .21
. .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Aug. 26.6	18.75 + .23	35.89 + .17	34.24 + .17	48.28 + .16	41.03 −3.00	44.84 + .16	59.49 + .21	35.10 + .24
Sept. 5.5	18.95 .16	36.04 .13	34.40 .14	48.43 .13	38.53 2.00	44.99 .13	59.68 .16	35.32 .20
15.5	19.08 .10	36.14 .08	34.52 .09	48.55 .09	37.02 −0.99	45.12 .10	59.82 .11	35.49 .15
25.5	19.14 + .03	36.21 + .04	34.59 .05	48.62 .05	36.56 +0.09	45.19 .06	59.91 .07	35.62 .10
Oct. 5.5	19.15 − .02	36.23 .00	34.62 + .02	48.66 + .02	37.20 1.19	45.23 .03	59.97 .04	35.68 .05
15.4	19.10 − .08	36.21 − .04	34.62 − .01	48.66 − .01	38.94 +2.29	45.25 + .01	60.00 + .01	35.71 + .01
25.4	18.98 .14	36.15 .08	34.59 .05	48.64 .03	41.79 3.37	45.24 − .02	59.98 − .02	35.70 − .04
Nov. 4.4	18.82 .18	36.05 .12	34.53 .08	48.60 .05	45.69 4.41	45.20 .05	59.94 .05	35.64 .08
14.4	18.62 .22	35.91 .15	34.42 .11	48.53 .08	50.61 5.38	45.14 .07	59.87 .09	35.54 .11
24.3	18.37 .25	35.76 .17	34.30 .13	48.44 .09	56.45 6.23	45.05 .09	59.77 .11	35.41 .14
Dec. 4.3	18.11 − .29	35.58 − .18	34.16 − .15	48.34 − .10	63.06 +6.91	44.95 − .10	59.65 − .12	35.24 − .17
14.3	17.79 .32	35.39 .20	34.01 .16	48.24 .11	70.27 7.42	44.85 .10	59.52 .14	35.06 .19
24.2	17.47 .31	35.18 .21	33.84 .17	48.12 .12	77.91 7.71	44.75 .11	59.37 .15	34.85 .21
34.2	17.16 − .30	34.96 − .22	33.68 − .16	48.01 − .11	85.69 +7.82	44.64 − .11	59.21 − .16	34.64 − .22

Mean Solar Date.	δ Piscium.	γ Cassiop.	μ Androm.	43 Cephei.	κ Tucanæ.	f Piscium.	κ Octantis, S. P.	υ Androm.
	83° 1′	29° 53′	52° 6′	4° 20′	159° 28′	86° 58′	184° 47′	49° 9′
	h m	h m	h m	h m	h m	h m	h m	h m
	0 42	0 49	0 50	0 53	1 11	1 12	1 22	1 30
	s	s	s	s	s	s	s	s
(Dec. 30.2)	54.47 − .10	60.18 − .34	34.81 − .18	43.49 −2.86	59.67 − .55	3.63 − .12	63.72 +2.80	16.55 − .17
Jan. 9.2	54.36 .12	59.84 .34	34.63 .18	40.63 2.85	59.13 .53	3.51 .12	66.53 2.81	16.37 .19
19.2	54.23 .12	59.49 .35	34.45 .18	37.78 2.83	58.60 .51	3.39 .12	69.34 2.75	16.17 .21
29.1	54.12 − .10	59.15 − .34	34.27 − .18	34.98 −2.78	58.10 − .49	3.26 − .13	72.02 +2.55	15.95 − .23
. .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Sept. 5.6	57.61 + .16	64.24 + .26	38.14 + .19	58.54 +1.46	63.92 + .41	6.48 + .21	58.69 −1.62	19.56 + .26
15.6	57.75 .12	64.47 .20	38.31 .15	59.80 1.06	64.28 .31	6.66 .15	57.29 1.18	19.80 .21
25.5	57.85 .08	64.65 .14	38.44 .10	60.65 .64	64.54 .20	6.79 .11	56.34 .73	19.98 .16
Oct. 5.5	57.92 .05	64.74 .07	38.52 .06	61.07 + .21	64.69 + .10	6.89 .08	55.84 − .26	20.12 .12
15.5	57.96 + .02	64.79 + .01	38.56 + .03	61.07 − .22	64.74 .00	6.95 .05	55.83 + .25	20.22 .08
25.5	57.97 − .01	64.77 − .05	38.58 .00	60.63 − .66	64.68 − .11	6.99 + .02	56.33 + .74	20.28 + .05
Nov. 4.4	57.95 .03	64.68 .11	38.55 − .04	59.75 1.10	64.51 .22	7.00 − .01	57.31 1.24	20.31 + .01
14.4	57.92 .05	64.55 .16	38.50 .07	58.44 1.50	64.24 .31	6.98 .03	58.78 1.69	20.30 − .03
24.4	57.86 .08	64.36 .21	38.41 .10	56.75 1.88	63.90 .39	6.94 .05	60.68 2.07	20.25 .07
Dec. 4.3	57.76 .09	64.13 .25	38.29 .13	54.68 2.23	63.47 .45	6.88 .07	62.94 2.40	20.16 .10
14.3	57.67 − .10	63.86 − .29	38.15 − .15	52.30 −2.51	63.00 − .49	6.81 − .09	65.47 +2.62	20.05 − .13
24.3	57.56 .11	63.54 .32	37.99 .16	49.67 2.71	62.49 .52	6.70 .10	68.18 2.77	19.90 .15
34.3	57.45 − .11	63.21 − .33	37.83 − .16	46.88 −2.84	61.97 − .53	6.60 − .10	71.00 +2.84	19.74 − .17

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	π Piscium.	ν Piscium.	ζ Ceti.	γ Androm.	β Trianguli.	4 Urs. Min., S. P.	γ Trianguli.	67 Ceti.
	78° 26′ h m 1 31	85° 4′ h m 1 35	100° 53′ h m 1 45	48° 12′ h m 1 57	55° 32′ h m 2 2	348° 4′ h m 2 9	56° 40′ h m 2 10	96° 56′ h m 2 11
	s	s	s	s	s	s	s	s
(Dec. 30.3)	12.21 − .12	38.68 − .12	58.32 − .12	4.88 − .18	56.03 − .12	13.80 +1.03	42.64 − .11	26.36 − .08
Jan. 9.3	12.09 .13	38.56 .12	58.20 .12	4.70 .19	55.89 .15	14.87 1.10	42.51 .15	26.26 .11
19.2	11.96 .13	33.44 .13	58.08 .13	4.51 .20	55.72 .17	16.00 1.15	42.34 .17	26.13 .13
29.2	11.63 .13	38.30 .13	57.93 .14	4.30 .21	55.55 .18	17.17 1.15	42.17 .18	25.99 .14
Feb. 8.2	11.70 .13	38.18 .12	57.79 .13	4.08 .20	55.36 .18	18.30 1.11	41.99 .18	25.84 .15
18.2	11.57 − .13	38.07 − .11	57.66 − .12	3.90 − .17	55.18 − .17	19.39 +1.07	41.80 − .19	25.70 − .14
. .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Sept. 25.6	15.28 + .15	41.70 + .14	61.19 + .16	8.16 + .20	59.14 + .20	11.75 − .55	45.67 + .21	29.04 + .18
Oct. 5.5	15.39 .10	41.82 .10	61.32 .12	8.34 .16	59.32 .16	11.28 .39	45.86 .17	29.20 .14
15.5	15.48 .07	41.91 .07	61.42 .09	8.48 .12	59.46 .12	10.97 .23	46.01 .13	29.32 .10
25.5	15.54 + .04	41.97 + .05	61.50 + .06	8.58 + .08	59.56 + .08	10.82 − .07	46.13 + .10	29.41 + .08
Nov. 4.5	15.57 + .02	42.01 + .02	61.54 + .02	8.64 .04	59.63 .05	10.83 + .11	46.20 .06	29.48 .05
14.4	15.58 − .01	42.01 − .01	61.55 − .01	8.67 + .01	59.67 + .02	11.04 .31	46.25 + .02	29.51 + .02
24.4	15.56 .04	41.99 .04	61.53 .03	8.66 − .03	59.66 − .02	11.45 .50	46.25 − .01	29.52 − .01
Dec. 4.4	15.50 .06	41.94 .06	61.49 .05	8.61 .07	59.63 .05	12.03 .66	46.23 .04	29.50 .04
14.3	15.43 − .08	41.88 − .08	61.43 − .08	8.51 − .11	59.56 − .08	12.77 + .82	46.17 − .08	29.45 − .07
24.3	15.34 .09	41.79 .10	61.33 .10	8.39 .14	59.46 .11	13.66 .96	46.07 .11	29.37 .09
34.3	15.24 − .10	41.68 − .12	61.22 − .11	8.23 − .18	59.33 − .14	14.69 +1.09	45.95 − .13	29.27 − .11

Mean Solar Date.	δ Hydri.	δ Ceti.	μ Hydri.	θ Persei.	σ Arietis.	47 Cephei.	ε Arietis.	β Persei. (*Algol.*)
	159° 10′ h m 2 19	90° 9′ h m 2 33	169° 36′ h m 2 33	41° 15′ h m 2 36	75° 23′ h m 2 45	11° 1′ h m 2 51	69° 6′ h m 2 52	49° 28′ h m 3 0
	s	s	s	s	s	s	s	s
(Dec. 30.3)	47.34 − .50	47.31 − .10	64.97 −1.15	37.20 − .16	21.63 − .08	23.62 − .75	51.73 − .09	56.81 − .11
Jan. 9.3	46.81 .54	47.20 .11	63.82 1.19	37.02 .20	21.54 .12	22.81 .87	51.63 .11	56.68 .15
19.3	46.25 .56	47.09 .13	62.61 1.21	36.80 .22	21.40 .14	21.88 .99	51.50 .13	56.51 .18
29.2	45.68 .57	46.94 .15	61.39 1.22	36.57 .24	21.26 .15	20.84 1.05	51.36 .15	56.31 .20
Feb. 8.2	45.12 .56	46.80 .14	60.18 1.20	36.32 .25	21.11 .16	19.78 1.07	51.20 .16	56.10 .21
18.2	44.57 − .54	46.65 − .14	59.00 −1.17	36.07 − .25	20.96 − .15	18.70 −1.08	51.04 − .15	55.89 − .21
. .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Sept. 25.6	49.90 + .35	49.82 + .20	67.00 + .74	40.38 + .28	24.18 + .22	29.37 + .90	54.28 + .21	59.57 + .28
Oct. 5.6	50.21 .27	50.00 .16	67.64 .54	40.64 .24	24.38 .18	30.20 .76	54.48 .19	59.83 .24
15.5	50.44 .18	50.15 .13	63.07 .32	40.86 .20	24.54 .15	30.89 .62	54.66 .17	60.05 .21
25.5	50.56 + .07	50.26 + .10	68.28 + .10	41.03 + .15	24.68 + .12	31.43 + .46	54.83 + .14	60.25 + .18
Nov. 4.5	50.57 − .05	50.35 .08	68.26 − .12	41.17 .11	24.78 .09	31.79 .28	54.95 .10	60.40 .14
14.5	50.46 .16	50.42 .05	68.03 .34	41.24 .06	24.86 .07	31.98 + .09	55.03 .06	60.50 .09
24.4	50.25 .26	50.45 + .02	67.57 .55	41.28 + .02	24.91 + .03	32.01 − .08	55.08 .04	60.58 .05
Dec. 4.4	49.95 .35	50.45 − .01	66.93 .73	41.27 − .03	24.92 .00	31.83 .26	55.11 + .01	60.61 + .01
14.4	49.56 − .41	50.42 − .04	66.10 − .90	41.21 − .09	24.91 − .02	31.45 − .48	55.10 − .02	60.59 − .03
24.4	49.13 .47	50.37 .07	65.12 1.03	41.08 .13	24.87 .06	30.88 .65	55.06 .05	60.54 .08
34.3	48.62 − .54	50.28 − .10	64.05 −1.12	40.94 − .15	24.79 − .10	30.16 − .78	54.99 − .08	60.43 − .13

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ρ Octantis. S. P.	ι Hydri.	f Tauri.	γ Camelop.	γ Hydri.	ε Persei.	A¹ Tauri.	o Persei.
	185° 54′ h m 3 17	167° 48′ h m 3 18	77° 27′ h m 3 24	19° 1′ h m 3 38	164° 35′ h m 3 48	50° 19′ h m 3 50	68° 13′ h m 3 58	42° 35′ h m 4 0
	s	s	s	s	s	s	s	s
(Dec.30.4)	36.94 +2.15	48.15 − .83	44.60 − .05	40.35 − .31	61.46 − .60	24.47 − .07	8.08 − .04	36.58 − .06
Jan. 9.3	39.15 2.26	47.25 .95	44.53 .09	40.00 .39	60.82 .68	24.38 .11	8.03 .08	36.49 .12
19.3	41.50 2 39	46.25 1.03	44.41 .12	39.57 .47	60.09 .77	24.25 .15	7.92 .11	36.34 .17
29.3	43.93 2.45	45.20 1.06	44.28 .14	39.05 .54	59.28 .84	24.08 .18	7.80 .14	36.15 .21
Feb. 8.3	46.37 2.44	44.13 1.07	44.13 .15	38.48 .58	58.42 .88	23.89 .20	7.64 .16	35.92 .24
18.2	48.81 +2.39	43.06 −1.06	43.97 − .16	37.89 − .60	57.53 − .89	23.67 − .22	7.47 − .17	35.67 − .26
28.2	51.15 +2.24	42.00 −1.04	43.81 − .15	37.28 − .60	56.65 − .87	23.44 − .24	7.29 − .18	35.40 − .28
. .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Oct. 5.6	43.47 −1.11	48.41 + .65	47.04 + .23	44.42 + .63	60.79 + .60	27.13 + .30	10.41 + .27	39.32 + .34
15.6	42.52 .77	48.97 .47	47.25 .19	44.99 .53	61.33 .48	27.41 .26	10.66 .23	39.64 .30
25.5	41.93 − .38	49.35 + .29	47.42 + .16	45.48 + .44	61.75 + .36	27.65 + .23	10.87 + .20	39.92 + .27
Nov. 4.5	41.76 + .06	49.54 + .09	47.57 .13	45.88 .35	62.04 .21	27.87 .20	11.06 .18	40.18 .23
14.5	42.05 .48	49.53 − .10	47.69 .10	46.18 .25	62.17 + .06	28.05 .16	11.23 .14	40.40 .19
24.5	42.72 .89	49.35 .28	47.77 .07	46.38 .14	62.16 − .08	28.19 .12	11.35 .10	40.56 .14
Dec. 4.4	43.82 1.29	48.98 .46	47.82 .04	46.45 + .02	62.00 .23	28.28 .07	11.43 .06	40.67 .08
14.4	45.30 +1.64	48.43 − .63	47.84 + .01	46.42 − .10	61.69 − .39	28.32 + .02	11.48 + .03	40.73 + .03
24.4	47.09 1.93	47.73 .77	47.83 − .03	46.26 .22	61.22 .52	28.32 − .02	11.50 .00	40.73 − .02
34.4	49.15 +2.18	46.89 − .90	47.78 − .07	45.98 − .34	60.66 − .62	28.28 − .07	11.48 − .04	40.69 − .07

Mean Solar Date.	o¹ Eridani.	η Urs. Min., S. P.	m Persei.	δ Mensæ.	τ Tauri.	ι Tauri.	ζ Aurigæ.	β Eridani.
	97° 8′ h m 4 6	346° 1′ h m 4 20	47° 10′ h m 4 25	170° 28′ h m 4 25	67° 15′ h m 4 35	71° 21′ h m 4 44	49° 5′ h m 4 54	95° 14′ h m 5 2
	s	s	s	s	s	s	s	s
(Dec.30.4)	26.98 − .03	40.75 + .47	36.68 − .03	37.78 − .90	35.15 .00	53.04 + .02	43.54 .00	23.90 + .02
Jan. 9.4	26.93 .07	41.31 .64	36.63 .08	36.80 1.06	35.13 − .05	53.03 − .03	43.52 − .04	23.89 − .03
19.4	26.83 .11	42.02 .77	36.52 .13	35.66 1.21	35.06 .10	52.97 .08	43.46 .10	23.84 .08
29.3	26.71 .14	42.84 .86	36.36 .17	34.37 1.34	34.93 .13	52.87 .12	43.32 .15	23.73 .11
Feb. 8.3	26.56 .16	43.73 .92	36.17 .20	32.99 1.41	34.80 .15	52.73 .15	43.15 .19	23.61 .13
18.3	26.40 − .17	44.68 + .96	35.95 − .23	31.55 −1.45	34.63 − .18	52.58 − .17	42.95 − .22	23.46 − .16
28.3	26.22 .18	45.65 .95	35.71 .24	30.08 1.46	34.44 .19	52.40 .18	42.72 .24	23.28 .18
Mar. 10.2	26.05 − .17	46.58 + .90	35.47 − .25	28.63 −1.43	34.26 − .18	52.22 − .18	42.48 − .24	23.10 − .18
. .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Oct. 15.6	29.10 + .21	40.41 − .72	39.46 + .30	34.00 + .85	37.50 + .28	55.27 + .26	46.07 + .33	25.65 + .23
25.6	29.30 + .19	39.76 − .58	39.75 + .28	34.79 + .70	37.76 + .24	55.52 + .24	46.39 + .30	25.88 + .22
Nov. 4.6	29.48 .16	39.24 .45	40.03 .25	35.39 .47	37.99 .21	55.76 .22	46.68 .28	26.11 .21
14.5	29.63 .13	38.86 .30	40.25 .21	35.74 + .22	38.18 .18	55.97 .19	46.95 .25	26.30 .19
24.5	29.75 .09	38.64 − .13	40.45 .17	35.86 − .01	38.35 .15	56.13 .15	47.18 .20	26.48 .16
Dec. 4.5	29.82 .05	38.60 + .04	40.60 .12	35.71 .27	38.49 .10	56.27 .12	47.35 .15	26.62 .12
14.5	29.86 + .02	38.73 + .22	40.67 + .06	35.31 − .52	38.56 + .06	56.37 + .08	47.48 + .10	26.71 + .08
24.4	29.87 − .01	39.04 .39	40.72 + .02	34.67 .74	38.61 + .03	56.43 + .04	47.56 + .05	26.77 + .04
34.4	29.84 − .04	39.51 + .55	40.71 − .03	33.82 − .95	38.62 .00	56.45 .00	47.59 .00	26.79 .00

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	τ Orionis.	χ Aurigæ.	Groombr. 944.	κ Orionis.	ν Aurigæ.	δ Doradus.	β Aurigæ.	θ Aurigæ.
	96° 58′ h m 5 12	57° 54′ h m 5 25	4° 52′ h m 5 26	99° 43′ h m 5 42	50° 53′ h m 5 43	155° 47′ h m 5 44	45° 4′ h m 5 51	52° 48′ h m 5 52
	s	s	s	s	s	s	s	s
(Dec. 30.5	13.30 + .02	30.61 + .06	39.53 − .25	29.93 + .06	48.19 + .08	37.80 − .13	23.72 + .09	9.56 + .10
Jan. 9.4	13.30 − .02	30.64 .00	39.04 .73	29.96 .00	48.24 + .02	37.62 .23	23.78 + .02	9.62 + .03
19.4	13.26 .06	30.61 − .05	38.07 1.20	29.93 − .05	48.22 − .04	37.34 .32	23.76 − .04	9.61 − .03
29.4	13.17 .11	30.54 .10	36.64 1.64	29.86 .10	48.15 .10	36.98 .39	23.69 .10	9.55 .09
Feb. 8.3	13.03 .14	30.40 .15	34.80 1.99	29.74 .13	48.02 .15	36.56 .46	23.55 .16	9.43 .14
18.3	12.89 − .16	30.24 − .18	32.70 −2.22	29.60 − .15	47.86 − .18	36.05 − .52	23.37 − .20	9.28 − .18
28.3	12.71 .17	30.05 .19	30.36 2.39	29.43 .17	47.65 .21	35.52 .55	23.15 .23	9.08 .20
Mar. 10.3	12.53 .18	29.85 .20	27.92 2.45	29.25 .18	47.43 .22	34.95 .57	22.91 .24	8.87 .21
20.3	12.35 − .18	29.64 − .21	25.46 −2.45	29.07 − .18	47.21 − .21	34.38 − .57	22.66 − .25	8.66 − .21
. .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Oct. 25.6	15.20 + .24	33.12 + .29	48.74 +2.56	31.61 + .26	50.71 + .37	36.66 + .47	26.31 + .38	11.99 + .34
Nov. 4.6	15.43 .22	33.40 .27	51.15 2.25	31.86 .24	51.05 .32	37.10 .40	26.68 .35	12.32 .31
14.6	15.64 .19	33.67 .25	53.24 1.92	32.09 .22	51.35 .29	37.47 .32	27.02 .32	12.62 .29
24.5	15.82 .16	33.91 .22	54.99 1.53	32.30 .18	51.63 .25	37.74 .23	27.33 .28	12.90 .26
Dec. 4.5	15.97 .12	34.11 .18	56.30 1.08	32.46 .15	51.86 .21	37.93 .14	27.58 .24	13.15 .22
14.5	16.06 + .08	34.27 + .13	57.15 + .60	32.60 + .10	52.05 + .16	38.02 + .04	27.80 + .19	13.35 + .17
24.5	16.13 .06	34.37 .08	57.50 + .10	32.68 .06	52.19 .11	38.01 − .07	27.96 .13	13.49 .12
34.4	16.18 + .03	34.44 + .03	57.34 − .40	32.73 + .02	52.27 + .06	37.88 − .20	28.05 + .07	13.59 + .08

Mean Solar Date.	η Geminor.	ψ¹ Aurigæ.	ν Geminor.	χ Draconis, S. P.	ε Geminor.	ψ⁵ Aurigæ.	θ Geminor.	ζ Mensæ.
	67° 28′ h m 6 8	40° 39′ h m 6 16	69° 43′ h m 6 22	342° 41′ h m 6 22	64° 46′ h m 6 37	46° 19′ h m 6 38	55° 54′ h m 6 45	170° 42′ h m 6 49
	s	s	s	s	s	s	s	s
(Dec. 30.5)	11.00 + .10	21.61 + .13	22.66 + .11	59.30 + .05	6.49 + .12	44.74 + .14	28.78 + .13	26.72 − .16
Jan. 9.5	11.07 + .04	21.70 + .05	22.74 + .05	59.40 .16	6.58 .06	44.85 .08	28.89 .09	26.44 .40
19.4	11.09 − .01	21.71 − .02	22.76 .00	59.62 .30	6.62 + .02	44.90 + .02	28.96 + .03	25.91 .65
29.4	11.04 .06	21.66 .09	22.74 − .04	60.00 .44	6.62 − .03	44.88 − .05	28.95 − .03	25.14 .89
Feb. 8.4	10.96 .10	21.53 .15	22.67 .09	60.49 .53	6.55 .09	44.80 .11	28.90 .08	24.14 1.09
18.4	10.84 − .14	21.37 − .20	22.55 − .13	61.06 + .62	6.44 − .13	44.67 − .16	28.79 − .13	22.97 −1.24
28.3	10.68 .17	21.14 .24	22.40 .16	61.73 .71	6.30 .16	44.48 .20	28.63 .17	21.67 1.37
Mar. 10.3	10.51 .19	20.88 .27	22.23 .18	62.47 .74	6.13 .18	44.28 .22	28.45 .20	20.24 1.47
20.3	10.31 .19	20.60 .28	22.04 .19	63.22 .75	5.94 .19	44.04 .24	28.24 .21	18.74 1.52
30.2	10.13 .18	20.32 .27	21.86 .18	63.99 .76	5.75 .19	43.79 .25	28.04 .21	17.21 1.53
Apr. 9.2	9.95 − .18	20.06 − .25	21.69 − .17	64.75 + .75	5.57 − .18	43.55 − .24	27.82 − .20	15.68 −1.51
. .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Nov. 14.6	13.66 + .27	24.91 + .39	25.20 + .28	59.52 − .56	9.06 + .30	47.75 + .37	31.52 + .33	19.65 + .97
24.6	13.92 .24	25.27 .33	25.47 .25	59.01 .45	9.35 .27	48.10 .33	31.84 .30	20.51 .75
Dec. 4.6	14.15 .20	25.58 .28	25.71 .22	58.61 .34	9.61 .24	48.41 .29	32.13 .26	21.16 .52
14.5	14.33 + .16	25.84 + .23	25.91 + .18	58.33 − .21	9.84 + .20	48.67 + .25	32.37 + .22	21.56 + .27
24.5	14.48 .12	26.05 .17	26.08 .13	58.19 − .07	10.02 .16	48.90 .20	32.58 .18	21.70 + .01
34.5	14.57 + .08	26.18 + .10	26.18 + .08	58.20 + .09	10.16 + .12	49.06 + .14	32.74 + .14	21.58 − .25

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Geminor.	63 Aurigæ.	25 Camelop.	γ^2 Volantis.	β Can. Min.	26 Lyncis.	Groombr. 1374.	ω^1 Cancri.
	69° 16′	50° 30′	7° 23′	160° 19′	81° 29′	42° 9′	15° 47′	64° 18′
	h m 6 57	h m 7 4	h m 7 7	h m 7 9	h m 7 21	h m 7 46	h m 7 46	h m 7 54
	s	s	s	s	s	s	s	s
(Dec. 30.5)	31.87 + .14	1.63 + .18	47.55 + .70	45.44 + .05	8.21 + .15	38.14 + .24	55.78 + .53	13.14 + .20
Jan. 9.5	31.98 .09	1.78 .12	48.06 + .32	45.43 − .07	8.34 .11	38.36 .19	56.21 .33	13.32 .15
19.5	32.05 + .04	1.86 + .05	48.19 − .03	45.30 .21	8.43 .06	38.51 .12	56.44 + .16	13.45 .10
29.4	32.05 − .01	1.87 − .01	48.00 .37	45.02 .33	8.46 + .01	38.59 + .04	56.52 .00	13.52 + .04
Feb. 8.4	32.02 .06	1.83 .07	47.45 .70	44.65 .42	8.45 − .03	38.58 − .04	56.44 − .17	13.53 − .01
18.4	31.94 − .11	1.73 − .13	46.60 − .99	44.18 − .52	8.39 − .08	38.52 − .10	56.18 − .32	13.49 − .05
28.4	31.81 .15	1.57 .17	45.48 1.22	43.62 .59	8.29 .12	38.38 .16	55.80 .45	13.42 .10
Mar. 10.3	31.65 .16	1.39 .20	44.16 1.40	43.00 .65	8.16 .14	38.20 .20	55.28 .56	13.29 .14
20.3	31.48 .18	1.18 .22	42.69 1.50	42.33 .68	8.02 .15	37.98 .23	54.69 .63	13.12 .17
30.3	31.29 .19	0.95 .23	41.17 1.55	41.64 .70	7.86 .16	37.74 .25	54.02 .69	12.95 .18
Apr. 9.2	31.11 − .18	0.73 − .21	39.60 −1.55	40.94 − .68	7.70 − .16	37.48 − .26	53.31 − .70	12.78 − .17
19.2	30.94 − .17	0.53 − .18	38.08 −1.49	40.27 − .65	7.55 − .15	37.23 − .25	52.62 − .67	12.61 − .16
. .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Nov. 24.6	34.58 + .29	4.75 + .32	56.29 +1.62	43.81 + .50	10.59 + .27	41.28 + .43	60.61 + .90	15.73 + .33
Dec. 4.6	34.85 .25	5.06 .30	57.84 1.44	44.24 .36	10.85 .25	41.69 .38	61.48 .83	16.05 .30
14.6	35.08 + .21	5.36 + .27	59.17 +1.18	44.54 + .25	11.09 + .22	42.05 + .33	62.26 + .72	16.34 + .27
24.5	35.28 .17	5.60 .22	60.19 .87	44.74 + .13	11.30 .18	42.36 .29	62.91 .59	16.60 .24
34.5	35.43 + .12	5.79 + .16	60.90 + .51	44.80 .00	11.46 + .14	42.63 + .24	63.43 + .45	16.82 + .21

Mean Solar Date.	ζ^1 Cancri.	β Cancri.	30 Monocerotis.	θ Chamæleontis.	σ Hydræ.	γ Cancri.	σ^2 Cancri. (*mean.*)	θ Hydræ.
	72° 1′	80° 28′	93° 33′	167° 8′	86° 16′	68° 8′	59° 0′	87° 13′
	h m 8 5	h m 8 10	h m 8 20	h m 8 23	h m 8 32	h m 8 36	h m 8 47	h m 9 8
	s	s	s	s	s	s	s	s
(Dec. 30.6)	50.95 + .20	29.94 + .20	7.12 + .20	63.97 + .31	57.64 + .20	51.86 + .24	28.40 + .26	35.47 + .25
Jan. 9.5	51.13 .16	30.12 .16	7.30 .15	64.20 + .15	57.83 .17	52.08 .20	28.64 .22	35.70 .20
19.5	51.27 .11	30.26 .10	7.43 .10	64.27 − .03	57.99 .12	52.25 .14	28.84 .16	35.88 .15
29.5	51.35 + .05	30.32 .05	7.49 .05	64.14 .22	58.07 .07	52.36 .08	28.97 .10	36.00 .10
Feb. 8.5	51.37 .00	30.35 + .01	7.52 + .01	63.84 .39	58.12 + .02	52.41 + .03	29.04 + .05	36.08 .06
18.4	51.35 − .05	30.33 − .04	7.51 − .04	63.37 − .55	58.12 − .03	52.42 − .01	29.07 − .01	36.12 + .01
28.4	51.28 .10	30.26 .09	7.44 .09	62.74 .70	58.06 .07	52.38 .06	29.02 .07	36.09 − .04
Mar. 10.4	51.16 .13	30.15 .12	7.33 .12	61.98 .81	57.97 .10	52.29 .11	28.93 .11	36.04 .08
20.4	51.02 .15	30.02 .14	7.21 .14	61.12 .91	57.86 .13	52.16 .14	28.81 .14	35.94 .11
30.3	50.86 .16	29.86 .15	7.05 .16	60.17 .98	57.71 .15	52.02 .15	28.66 .16	35.82 .13
Apr. 9.3	50.70 − .17	29.71 − .16	6.89 − .16	59.17 −1.02	57.56 − .15	51.86 − .16	28.50 − .17	35.69 − .14
19.3	50.53 .16	29.55 .16	6.73 .16	58.13 1.04	57.41 .15	51.70 .16	28.32 .18	35.55 .15
29.2	50.38 .15	29.39 .15	6.57 .15	57.08 1.04	57.25 .15	51.54 .15	28.15 .17	35.40 .15
May 9.2	50.24 − .14	29.26 − .12	6.43 − .13	56.05 −1.02	57.11 − .14	51.39 − .14	27.99 − .16	35.26 − .14

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Argus.	α Lyncis.	10 Leonis Minoris.	ο Leonis.	ζ Chamæleontis.	19 Leonis Minoris.	π Leonis.	λ Ursæ Majoris.
	159° 16′	55° 8′	53° 7′	79° 36′	170° 27′	48° 25′	81° 25′	46° 32′
	h m 9 11	h m 9 14	h m 9 27	h m 9 35	h m 9 37	h m 9 50	h m 9 54	h m 10 10
	s	s	s	s	s	s	s	s
(Dec.30.6)	62.01 + .38	17.48 + .29	25.33 + .29	13.52 + .27	15.46 + .84	52.97 + .35	20.72 + .27	23.80 + .36
Jan. 9.6	62.34 .27	17.75 .25	25.61 .25	13.77 .23	16.18 .60	53.30 .30	20.98 .24	24.16 .33
19.6	62.56 .16	17.98 .20	25.87 .22	13.98 .19	16.67 .38	53.58 .25	21.21 .21	24.47 .28
29.5	62.66 + .04	18.16 .14	26.06 .16	14.15 .13	16.93 + .14	53.81 .19	21.39 .16	24.72 .22
Feb. 8.5	62.64 − .08	18.26 .08	26.18 .10	14.25 .08	16.95 − .10	53.97 .13	21.52 .10	24.92 .15
18.5	62.50 − .19	18.31 + .02	26.25 + .04	14.31 + .04	16.74 − .33	54.06 + .07	21.59 + .05	25.04 + .09
28.5	62.26 .29	18.30 − .03	26.26 − .01	14.33 .00	16.30 .54	54.10 + .01	21.63 + .01	25.11 + .03
Mar. 10.4	61.91 .38	18.24 .08	26.22 .07	14.30 − .05	15.67 .73	54.08 − .05	21.62 − .03	25.11 − .03
20.4	61.50 .45	18.13 .12	26.11 .12	14.22 .09	14.86 .89	54.00 .10	21.56 .07	25.05 .09
30.4	61.02 .52	17.99 .15	25.98 .15	14.12 .11	13.88 1.03	53.87 .14	21.48 .10	24.93 .13
Apr. 9.3	60.47 − .55	17.83 − .17	25.82 − .16	14.00 − .13	12.80 −1.14	53.72 − .17	21.37 − .12	24.79 − .15
19.3	59.91 .57	17.65 .18	25.65 .18	13.87 .14	11.60 1.23	53.54 .18	21.24 .13	24.62 .17
29.3	59.33 .58	17.47 .18	25.46 .18	13.72 .14	10.33 1.28	53.35 .19	21.11 .13	24.44 .19
May 9.3	58.74 .59	17.29 .17	25.29 .17	13.59 .13	9.04 1.31	53.17 .19	20.98 .13	24.24 .20
19.2	58.15 − .59	17.13 − .15	25.12 − .16	13.46 − .12	7.72 −1.33	52.98 − .18	20.85 − .13	24.05 − .19

Mean Solar Date.	μ Hydræ.	β Leonis Minoris.	α Antliæ.	β Octantis, S. P.	41 Leonis Minoris.	δ² Chamæleontis.	46 Leonis Minoris.	Groombr. 1706.
	106° 16′	52° 43′	120° 30′	188° 2′	66° 14′	169° 57′	55° 11′	11° 38′
	h m 10 20	h m 10 21	h m 10 22	h m 10 34	h m 10 37	h m 10 44	h m 10 47	h m 10 51
	s	s	s	s	s	s	s	s
Jan. 19.6	43.82 + .23	28.15 + .28	5.03 + .22	29.59 − .65	23.01 + .25	50.95 + .74	6.39 + .30	5.79 + .94
29.6	44.02 .17	28.40 .22	5.22 .16	29.06 .40	23.24 .21	51.59 .54	6.66 .24	6.66 .79
Feb. 8.6	44.16 .11	28.59 .15	5.35 .11	28.78 − .15	23.43 .17	52.03 .33	6.87 .18	7.36 .60
18.5	44.25 .06	28.71 .10	5.44 .06	28.75 + .08	23.57 .11	52.25 + .12	7.03 .13	7.85 .39
28.5	44.29 + .02	28.79 + .04	5.48 + .02	28.94 .31	23.64 .05	52.27 − .08	7.13 .07	8.13 + .17
Mar. 10.5	44.30 − .02	28.80 − .01	5.47 − .03	29.38 − .56	23.67 + .01	52.08 − .28	7.17 + .02	8.19 − .04
20.4	44.26 .05	28.77 .05	5.42 .07	30.05 .78	23.66 − .03	51.71 .47	7.17 − .03	8.05 .24
30.4	44.19 .08	28.69 .10	5.34 .10	30.93 .99	23.61 .06	51.15 .64	7.12 .07	7.71 .43
Apr. 9.4	44.10 .11	28.56 .13	5.22 .13	32.02 1.17	23.53 .09	50.44 .78	7.03 .10	7.19 .59
19.4	43.97 .13	28.42 .15	5.08 .14	33.27 1.34	23.42 .12	49.60 .90	6.92 .13	6.54 .71
29.3	43.85 − .13	28.27 − .16	4.93 − .15	34.69 −1.47	23.30 − .13	48.64 −1.01	6.78 − .14	5.78 − .81
May 9.3	43.72 .14	28.10 .17	4.77 .16	36.21 1.58	23.16 .14	47.57 1.06	6.63 .15	4.93 .87
19.3	43.58 .13	27.93 .16	4.62 .16	37.84 1.66	23.03 .13	46.47 1.13	6.48 .15	4.05 .89
29.3	43.45 .12	27.77 .16	4.45 .15	39.53 1.70	22.90 .13	45.31 1.17	6.32 .15	3.15 .88
June 8.2	43.33 − .11	27.62 − .15	4.31 − .13	41.23 −1.68	22.78 − .12	44.12 −1.20	6.18 − .14	2.28 − .85

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	η Octantis.	p³ Leonis.	ψ Urs. Maj.	ν Urs. Maj.	ξ Hydræ.	χ Urs. Maj.	π Virginis.	ε Corvi.
	174° 0′	87° 27′	44° 54′	56° 18′	121° 15′	41° 36′	82° 46′	112° 0′
	h m 11 0	h m 11 1	h m 11 3	h m 11 12	h m 11 27	h m 11 40	h m 11 55	h m 12 4
	s	s	s	s	s	s	s	s
Feb. 8.6	18.06 + .66	15.08 + .17	26.06 + .23	29.71 + .23	33.36 + .19	12.02 + .29	11.46 + .22	25.47 + .23
18.6	18.54 + .31	15.22 .19	26.26 .17	29.90 .16	33.53 .14	12.28 .23	11.66 .18	25.68 .18
28.5	18.68 − .02	15.31 .07	26.40 .10	30.02 .10	33.65 .10	12.48 .16	11.82 .13	25.84 .13
Mar. 10.5	18.51 .34	15.36 + .03	26.47 + .04	30.10 + .05	33.72 .05	12.59 .09	11.92 .08	25.95 .09
20.5	17.99 .66	15.37 − .01	26.49 − .01	30.12 .00	33.74 + .01	12.66 + .03	11.98 .05	26.02 .05
30.4	17.20 − .94	15.34 − .04	26.44 − .07	30.10 − .04	33.74 − .03	12.66 − .03	12.02 + .02	26.04 + .02
Apr. 9.4	16.12 1.21	15.30 .06	26.34 .11	30.04 .08	33.69 .06	12.60 .08	12.02 − .01	26.06 .00
19.4	14.79 1.44	15.22 .08	26.23 .14	29.94 .11	33.62 .09	12.50 .12	11.99 .04	26.04 − .03
29.4	13.24 1.63	15.13 .10	26.07 .17	29.83 .12	33.52 .11	12.36 .15	11.93 .07	25.99 .06
May 9.3	11.53 1.78	15.02 .11	25.89 .18	29.70 .14	33.40 .13	12.20 .17	11.85 .08	25.92 .08
19.3	9.68 −1.91	14.90 − .12	25.71 − .19	29.55 − .15	33.26 − .14	12.01 − .19	11.77 − .09	25.82 − .10
29.3	7.72 1.99	14.79 .11	25.51 .19	29.41 .15	33.12 .15	11.82 .20	11.68 .10	25.71 .11
June 8.3	5.70 2.00	14.68 .10	25.32 .19	29.25 .15	32.97 .15	11.60 .21	11.57 .11	25.60 .12
18.2	3.71 −1.97	14.58 − .09	25.14 − .18	29.11 − .14	32.82 − .14	11.40 − .19	11.47 − .10	25.49 − .10

Mean Solar Date.	2 Can. Ven.	6 Urs. Min.	δ² Corvi.	β Can. Ven.	γ Virginis, (*mean.*)	31 Comæ Berenices.	γ Cassiop., S. P.	43 Cephei, S. P.
	48° 43′	1° 41′	105° 54′	48° 2′	90° 50′	61° 51′	330° 7′	355° 40′
	h m 12 10	h m 12 14	h m 12 24	h m 12 28	h m 12 36	h m 12 46	h m 12 49	h m 12 53
	s	s	s	s	s	s	s	s
Feb. 8.6	34.29 + .28	44.44 +5.72	7.76 + .24	28.68 + .29	2.41 + .25	17.81 + .28	58.84 − .31	32.57 −2.49
18.6	34.55 .23	49.63 4.60	7.98 .20	28.95 .25	2.64 .20	18.07 .24	58.56 .24	30.28 2.09
28.6	34.76 .18	53.64 3.36	8.15 .16	29.18 .20	2.82 .16	18.29 .20	58.35 .18	28.40 1.67
Mar. 10.5	34.91 .12	56.35 2.00	8.29 .12	29.35 .15	2.96 .12	18.47 .15	58.20 .12	26.94 1.21
20.5	35.01 .07	57.63 + .59	8.38 .08	29.47 .10	3.06 .09	18.60 .10	58.12 − .05	25.99 .68
30.5	35.05 + .02	57.52 − .78	8.44 + .04	29.54 + .04	3.14 + .06	18.67 + .06	58.11 + .04	25.58 − .10
Apr. 9.5	35.05 − .03	56.05 2.10	8.47 + .01	29.55 − .01	3.17 + .02	18.72 + .03	58.20 .12	25.80 + .47
19.4	35.00 .07	53.30 3.32	8.46 − .02	29.53 .05	3.18 − .01	18.73 − .01	58.36 .20	26.52 .98
29.4	34.92 .10	49.39 4.39	8.44 .04	29.46 .09	3.16 .03	18.71 .04	58.60 .28	27.76 1.46
May 9.4	34.80 .13	44.51 5.28	8.38 .06	29.35 .12	3.13 .05	18.65 .07	58.93 .36	29.44 1.87
19.4	34.66 − .14	38.82 −5.98	8.31 − .08	29.23 − .14	3.06 − .07	18.58 − .09	59.32 + .41	31.49 +2.23
29.3	34.52 .16	32.54 6.47	8.22 .09	29.08 .16	2.99 .08	18.48 .11	59.75 .46	33.90 2.51
June 8.3	34.35 .17	25.88 6.75	8.13 .10	28.92 .17	2.91 .09	18.36 .12	60.24 .50	36.51 2.70
18.3	34.18 − .17	19.03 −6.82	8.03 − .10	28.74 − .18	2.81 − .10	18.24 − .11	60.76 + .54	39.29 +2.86

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Muscæ.	ε Virginis.	20 Can. Ven.	κ Octantis.	B.A.C.4536.	m Virginis.	θ Apodis.	π Hydræ.
	160° 57′	78° 27′	48° 51′	175° 13′	52° 15′	98° 9′	166° 16′	116° 9′
	h m 12 54	h m 12 56	h m 13 12	h m 13 23	h m 13 29	h m 13 35	h m 13 54	h m 14 0
	s	s	s	s	s	s	s	s
Mar. 0.6	42.08 + .42	39.70 + .18	34.67 + .24	18.80 +1.79	51.05 + .26	47.65 + .22	35.39 + .78	3.49 + .24
10.6	42.45 .32	39.87 .15	34.89 .20	20.41 1.43	51.29 .21	47.85 .18	36.12 .67	3.72 .22
20.6	42.71 .22	39.99 .11	35.07 .15	21.66 1.06	51.47 .16	48.01 .15	36.73 .54	3.93 .19
30.5	42.89 .12	40.08 .07	35.18 .10	22.53 .68	51.61 .11	48.15 .12	37.20 .41	4.10 .15
Apr. 9.5	42.95 + .02	40,14 .04	35.26 .05	23.01 + .30	51.70 .07	48.24 .08	37.56 .29	4.23 .11
19.5	42.93 – .07	40.17 + .01	35.28 + .01	23.12 – .09	51.75 + .03	48.31 + .05	37.78 + .15	4.33 + .06
29.4	42.81 .15	40.16 – .02	35.28 – .03	22.83 .48	51.76 – .01	48.35 + .02	37.86 + .02	4.40 .05
May 9.4	42.63 .23	40.14 .04	35.22 .07	22.17 .86	51.73 .04	48.36 .00	37.82 – .11	4.44 + .02
19.4	42.35 .32	40.08 .06	35.13 .10	21.12 1.21	51.67 .07	48.35 – .02	37.64 .24	4.45 .00
29.4	42.00 .38	40.01 .07	35.02 .12	19.76 1.50	51.59 .10	48.31 .04	37.34 .36	4.44 – .02
June 8.3	41.59 – .44	39.93 – .09	34.88 – .15	18.12 –1.80	51.46 – .12	48.26 – .06	36.93 – .47	4.40 – .05
18.3	41.13 .49	39.84 .10	34.72 .16	16.17 2.04	51.33 .14	48.19 .08	36.40 .57	4.33 .08
28.3	40.61 .51	39.72 .11	34.56 .17	14.04 2.22	51.19 .16	48.10 .10	35.79 .65	4.24 .11
July 8.3	40.11 – .48	39.61 – .11	34.38 – .18	11.74 –2.34	51.01 – .19	47.99 – .12	35.10 – .72	4.12 – .13

Mean Solar Date.	d Bootis.	κ Virginis.	δ Octantis.	4 Urs. Min.	λ Bootis.	λ Virginis.	α Apodis.	μ Hydri, S. P.
	64° 23′	99° 45′	173° 9′	11° 56′	43° 24′	102° 52′	168° 34′	190° 24′
	h m 14 5	h m 14 6	h m 14 9	h m 14 9	h m 14 12	h m 14 13	h m 14 34	h m 14 33
	s	s	s	s	s	s	s	s
Mar. 20.6	21.07 + .20	59.26 + .19	21.38 +1.07	21.97 + .61	10.99 + .22	6.99 + .20	11.28 + .84	56.05 – .79
30.6	21.24 .14	59.43 .15	22.40 .90	22.49 .43	11.19 .18	7.17 .16	12.04 .69	55.34 .64
Apr. 9.5	21.36 .10	59.56 .11	23.20 .64	22.82 .24	11.35 .13	7.30 .12	12.65 .54	54.77 .46
19.5	21.44 .07	59.65 .08	23.72 .37	22.96 + .05	11.44 .07	7.41 .09	13.11 .39	54.41 .27
29.5	21.50 .04	59.73 .05	23.95 + .10	22.92 – .13	11.49 + .03	7.49 .06	13.42 .22	54.23 – .08
May 9.5	21.53 + .01	59.76 + .03	23.90 – .17	22.69 – .30	11.50 – .02	7.54 + .03	13.57 + .06	54.25 + .12
19.4	21.52 – .02	59.79 + .01	23.60 .43	22.29 .46	11.45 .06	7.56 + .01	13.55 – .10	54.47 .32
29.4	21.49 .04	59.79 – .02	23.04 .69	21.77 .59	11.37 .10	7.57 – .02	13.36 .26	54.88 .50
June 8.4	21.43 .07	59.75 .04	22.22 .95	21.10 .72	11.25 .13	7.53 .04	13.02 .42	55.47 .68
18.3	21.35 .10	59.70 .06	21.15 1.17	20.33 .81	11.10 .16	7.49 .06	12.52 .56	56.24 .84
28.3	21.24 – .12	59.63 – .08	19.89 –1.34	19.47 – .89	10.92 – .18	7.42 – .08	11.91 – .69	57.14 + .97
July 8.3	21.11 .13	59.53 .10	18.48 1.49	18.55 .94	10.73 .20	7.32 .11	11.15 .80	58.18 1.09
18.3	20.98 .14	59.41 .11	16.91 1.62	17.60 .96	10.51 .22	7.20 .12	10.32 .88	59.31 1.16
28.2	20.83 – .15	59.29 – .12	15.24 –1.73	16.63 – .97	10.28 – .23	7.08 – .12	9.39 – .94	60.49 +1.20

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	33 Bootis.	47 Cephei, S. P.	γ Scorpii.	δ Bootis.	ρ Octantis.	β Cor. Bor.	γ Camelop., S. P.	δ¹ Apodis.
	45° 7′	348° 59′	114° 51′	56° 16′	174° 6′	60° 31′	340° 59′	168° 25′
	h m 14 34	h m 14 51	h m 14 57	h m 15 11	h m 15 17	h m 15 23	h m 15 38	h m 16 3
	s	s	s	s	s	s	s	s
Mar. 30.6	43.63 + .20	15.33 − .52	35.38 + .22	2.64 + .22	57.31 +1.64	16.01 + .23	35.75 − .40	50.58 +1.08
Apr. 9.6	43.81 .15	14.91 .32	35.58 .18	2.84 .18	58.85 1.41	16.22 .19	35.40 .29	51.59 .94
19.5	43.92 .10	14.69 − .11	35.74 .15	3.00 .13	60.13 1.12	16.39 .15	35.17 .16	52.47 .81
29.5	44.01 .06	14.69 + .10	35.87 .12	3.11 .10	61.08 .81	16.53 .12	35.08 − .03	53.22 .67
May 9.5	44.05 + .01	14.89 .32	35.97 .08	3.20 .07	61.74 .49	16.62 .08	35.10 + .09	53.81 .52
19.5	44.04 − .03	15.33 + .53	36.05 + .06	3.25 + .03	62.06 + .15	16.69 + .05	35.26 + .23	54.25 + .36
29.4	43.99 .07	15.95 .71	36.09 + .03	3.27 .00	62.04 − .18	16.73 + .02	35.55 .36	54.50 .17
June 8.4	43.89 .10	16.76 .87	36.10 − .01	3.25 − .04	61.70 .51	16.72 − .01	35.95 .46	54.60 + .01
18.4	43.77 .13	17.68 1.00	36.07 .04	3.19 .08	61.02 .83	16.68 .05	36.47 .56	54.52 − .18
28.3	43.63 .16	18.77 1.13	36.03 .07	3.09 .11	60.04 1.13	16,61 .09	37.06 .64	54.24 .36
July 8.3	43.44 − .19	19.93 +1.20	35.94 − .10	2.97 − .13	58.77 −1.39	16.50 − .12	37.74 + .71	53.81 − .49
18.3	43.23 .21	21.16 1.25	35.83 .12	2.82 .15	57.26 1.62	16.37 .14	38.48 .75	53.24 .64
28.3	43.02 .22	22.43 1.27	35.71 .14	2.67 .17	55.53 1.80	16.22 .16	39.24 .78	52.53 .77
Aug. 7.2	42.78 .23	23.71 1.27	35.55 .16	2.48 .19	53.67 1.89	16.05 .18	40.04 .80	51.71 .87
17.2	42.55 .23	24.97 1.24	35.40 .16	2.28 .20	51.75 1.93	15.86 .19	40.84 .79	50.80 .93
27.2	42.32 − .22	26.19 +1.20	35.23 − .17	2.08 − .20	49.82 −1.92	15.67 − .19	41.63 + .77	49.85 − .95

Mean Solar Date.	φ Herculis.	σ Cor. Bor. (*mean.*)	γ Apodis.	η Urs. Min.	η Ophiuchi.	π Herculis.	θ Ophiuchi.	δ Aræ.
	44° 46′	55° 51′	168° 39′	13° 59′	105° 35′	53° 4′	114° 53′	150° 35′
	h m 16 5	h m 16 10	h m 16 16	h m 16 20	h m 17 4	h m 17 11	h m 17 15	h m 17 21
	s	s	s	s	s	s	s	s
Apr. 9.6	17.34 + .25	32.21 + .24	31.59 +1.00	49.02 + .67	1.25 + .28	11.60 + .30	12.07 + .30	5.91 + .53
19.6	17.57 .21	32.43 .20	32.54 .89	49.61 .52	1.52 .25	11.88 .26	12.36 .27	6.42 .49
29.6	17.76 .17	32.61 .16	33.36 .74	50.05 .37	1.76 .23	12.13 .23	12.62 .24	6.88 .45
May 9.6	17.91 .12	32.76 .13	34.01 .58	50.35 .22	1.98 .20	12.34 .20	12.85 .22	7.31 .40
19.5	18.01 .07	32.87 .09	34.52 .42	50.48 + .06	2.16 .17	12.52 .16	13.07 .20	7.67 .34
29.5	18.06 + .03	32.94 + .05	34.85 + .24	50.47 − .09	2.33 + .14	12.66 + .11	13.26 + .17	7.98 + .27
June 8.5	18.07 − .02	32.97 + .01	35.00 + .06	50.30 .25	2.46 .11	12.74 .07	13.40 .13	8.21 .20
18.4	18.03 .07	32.97 − .03	34.98 − .11	49.98 .39	2.55 .07	12.79 + .03	13.51 .09	8.39 .13
28.4	17.93 .11	32.92 .07	34.77 .30	49.52 .52	2.60 + .03	12.80 − .01	13.58 .05	8.47 + .05
July 8.4	17.80 .15	32.84 .11	34.38 .47	48.95 .64	2.61 .00	12.76 .06	13.61 + .01	8.49 − .02
18.4	17.63 − .18	32.71 − .14	33.83 − .63	48.25 − .74	2.60 − .03	12.68 − .10	13.60 − .03	8.43 − .10
28.3	17.44 .21	32.57 .16	33.13 .75	47.48 .81	2.54 .08	12.55 .15	13.55 .08	8.29 .18
Aug. 7.3	17.21 .23	32.39 .19	32.33 .87	46.63 .88	2.43 .11	12.38 .18	13.44 .12	8.08 .24
17.3	16.97 .26	32.19 .21	31.40 .95	45.72 .92	2.31 .14	12.19 .21	13.31 .14	7.82 .30
27.3	16.69 .28	31.97 .22	30.43 .98	44.78 .94	2.14 .15	11.97 .23	13.16 .16	7.48 .34
Sept. 6.2	16.43 − .27	31.75 − .22	29.44 − .99	43.83 − .95	2.00 − .16	11.73 − .24	12.98 − .18	7.13 − .36
16.2	16.16 .26	31.53 .22	28.46 .95	42.89 .90	1.81 .18	11.49 .25	12.79 .19	6.76 .37
26.2	15.91 .24	31.31 .23	27.55 .87	42.03 .84	1.64 .16	11.24 .24	12.61 .18	6.39 .35
Oct. 6.1	15.69 − .21	31.07 − .23	26.73 − .77	41.21 − .77	1.49 − .14	11.01 − .22	12.44 − .17	6.05 − .32

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	Groombr. 944,S.P.	ι Herculis.	θ Herculis.	ο Herculis.	λ Sagittarii.	χ Draconis.	ζ Pavonis.	γ Lyræ.
	355° 8′	43° 56′	52° 44′	61° 15′	115° 29′	17° 19′	161° 31′	57° 28′
	h m 17 26	h m 17 36	h m 17 52	h m 18 3	h m 18 21	h m 18 23	h m 18 30	h m 18 54
	s	s	s	s	s	s	s	s
May 19.6	15.69 − .49	21.81 + .20	28.31 + .20	14.17 + .20	8.56 + .25	7.17 + .43	7.20 + .65	48.76 + .25
29.6	15.43 − .03	21.98 .14	28.49 .16	14.36 .17	8.80 .23	7.54 .30	7.81 .57	49.00 .22
June 8.5	15.63 + .45	22.09 .09	28.63 .12	14.52 .13	9.02 .20	7.78 .18	8.33 .46	49.21 .19
18.5	16.32 .90	22.16 + .04	28.72 .07	14.62 .09	9.19 .16	7.90 + .06	8.73 .35	49.38 .14
28.5	17.43 1.32	22.18 − .01	28.77 + .02	14.70 + .05	9.33 .12	7.89 − .07	9.04 .24	49.48 .09
July 8.4	18.96 +1.71	22.14 − .07	28.77 − .03	14.72 .00	9.42 + .07	7.75 − .20	9.21 + .11	49.56 + .06
18.4	20.86 2.05	22.03 .12	28.72 .07	14.71 − .04	9.46 + .02	7.49 .31	9.25 − .02	49.60 + .01
28.4	23.05 2.35	21.89 .16	28.63 .11	14.65 .08	9.46 − .02	7.13 .42	9.17 .14	49.58 − .04
Aug. 7.4	25.55 2.61	21.70 .20	28.49 .15	14.54 .12	9.42 .06	6.64 .53	8.98 .25	49.51 .09
17.3	28.26 2.79	21.48 .24	28.32 .18	14.40 .16	9.34 .11	6.07 .61	8.67 .37	49.39 .13
27.3	31.13 +2.93	21.22 − .27	28.11 − .22	14.22 − .19	9.20 − .15	5.41 − .69	8.25 − .46	49.24 − .16
Sept. 6.3	34.12 3.02	20.94 .29	27.88 .24	14.03 .20	9.04 .17	4.69 .75	7.75 .53	49.06 .20
16.3	37.17 3.05	20.63 .30	27.63 .25	13.82 .21	8.87 .18	3.92 .78	7.19 .57	48.84 .22
26.2	40.22 3.02	20.33 .29	27.38 .25	13.60 .22	8.68 .19	3.13 .79	6.60 .59	48.62 .23
Oct. 6.2	43.20 2.94	20.05 .27	27.13 .25	13.38 .22	8.50 .18	2.33 .80	6.00 .60	48.39 .23
16.2	46.09 +2.81	19.78 − .24	26.89 − .24	13.17 − .21	8.32 − .17	1.54 − .79	5.41 − .59	48.16 − .22

Mean Solar Date.	ι Lyræ.	25 Camelop. S. P.	θ Lyræ.	β Cygni.	β Sagittæ.	δ Cygni.	Groombr. 1374,S.P.	ε Pavonis.
	54° 4′	352° 37′	52° 4′	62° 16′	72° 47′	45° 8′	344° 13′	163° 12′
	h m 19 3	h m 19 7	h m 19 12	h m 19 26	h m 19 36	h m 19 41	h m 19 46	h m 19 47
	s	s	s	s	s	s	s	s
May 29.6	22.00 + .24	33.65 − .66	32.38 + .25	16.02 + .24	5.03 + .26	31.91 + .26	50.46 − .36	47.67 + .79
June 8.6	22.22 .20	33.14 .36	32.61 .19	16.25 .22	5.27 .22	32.17 .24	50.16 .24	48.41 .69
18.6	22.40 .15	32.94 − .06	32.80 .15	16.46 .18	5.47 .19	32.39 .20	49.97 − .12	49.06 .60
28.5	22.53 .10	33.01 + .22	32.93 .11	16.62 .13	5.65 .15	32.57 .14	49.93 + .03	49.60 .50
July 8.5	22.60 .05	33.37 .50	33.02 .06	16.71 .08	5.77 .10	32.67 .09	50.02 .15	50.03 .38
18.5	22.63 + .01	34.01 + .79	33.06 + .02	16.79 + .05	5.85 + .06	32.73 + .04	50.22 + .27	50.32 + .22
28.4	22.62 − .04	34.94 1.03	33.06 − .03	16.81 .00	5.90 + .02	32.74 − .02	50.56 .40	50.47 + .08
Aug. 7.4	22.56 .09	36.07 1.24	32.99 .09	16.79 − .05	5.89 − .02	32.70 .06	51.03 .51	50.48 − .06
17.4	22.43 .14	37.43 1.45	32.87 .13	16.71 .10	5.85 .06	32.59 .13	51.58 .61	50.35 .20
27.4	22.28 .17	38.98 1.65	32.72 .17	16.59 .14	5.76 .10	32.44 .17	52.24 .70	50.08 .32
Sept. 6.3	22.09 − .20	40.73 +1.80	32.53 − .20	16.44 − .17	5.64 − .14	32.24 − .21	53.01 + .80	49.71 − .44
16.3	21.88 .23	42.58 1.91	32.31 .23	16.26 .19	5.48 .17	32.01 .24	53.83 .87	49.20 .54
26.3	21.63 .25	44.55 2.00	32.06 .25	16.06 .20	5.31 .18	31.76 .27	54.74 .93	48.64 .60
Oct. 6.3	21.39 .24	46.59 2.06	31.81 .25	15.85 .21	5.13 .19	31.47 .29	55.69 .97	48.01 .64
16.2	21.15 .24	48.64 2.05	31.56 .24	15.64 .20	4.94 .18	31.19 .28	56.68 .99	47.36 .65
26.2	20.91 − .22	50.69 +2.03	31.32 − .23	15.44 − .19	4.76 − .17	30.91 − .28	57.67 +1.01	46.71 − .63
Nov. 5.2	20.71 − .19	52.71 +1.97	31.10 − .20	15.25 − .18	4.60 − .15	30.63 − .27	58.69 +1.02	46.09 − .60

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Sagittæ.	ο Sagittarii.	θ Aquilæ.	31 Cygni.	α Delphini.	β Pavonis.	ψ Capricor.	ε Cygni.
	70° 49′ h m 19 53	118° 1′ h m 19 55	91° 9′ h m 20 5	43° 36′ h m 20 10	74° 29′ h m 20 34	156° 36′ h m 20 34	115° 40′ h m 20 39	56° 27′ h m 20 41
	s	s	s	s	s	s	s	s
June 18.6	50.87 + .21	51.62 + .26	36.16 + .21	10.16 + .23	30.41 + .23	60.05 + .52	32.81 + .27	44.81 + .26
28.6	51.06 .17	51.86 .21	36.36 .19	10.37 .19	30.63 .20	60.54 .46	33.07 .24	45.05 .22
July 8.6	51.21 .12	52.05 .17	36.54 .15	10.54 .13	30.82 .17	60.97 .38	33.30 .21	45.25 .17
18.5	51.30 .07	52.20 .12	36.67 .10	10.63 .07	30.97 .12	61.30 .29	33.49 .17	45.39 .12
28.5	51.36 + .04	52.29 .07	36.75 .05	10.67 + .02	31.05 .07	61.55 .19	33.63 .11	45.48 .07
Aug. 7.5	51.38 − .01	52.34 + .02	36.78 + .01	10.67 − .04	31.11 + .04	61.67 + .08	33.71 + .06	45.53 + .02
17.4	51.34 .05	52.33 − .03	36.78 − .02	10.59 .10	31.13 − .01	61.70 − .02	33.75 + .01	45.52 − .03
27.4	51.27 .10	52.28 .07	36.74 .06	10.46 .15	31.09 .06	61.62 .13	33.74 − .03	45.48 .07
Sept. 6.4	51.15 .13	52.18 .11	36.66 .10	10.29 .20	31.02 .09	61.45 .22	33.69 .07	45.38 .12
16.4	51.02 .15	52.05 .15	36.54 .13	10.07 .24	30.91 .12	61.17 .31	33.59 .11	45.24 .15
26.3	50.84 − .17	51.89 − .17	36.39 − .15	9.82 − .26	30.77 − .15	60.84 − .37	33.46 − .14	45.07 − .17
Oct. 6.3	50.66 .18	51.72 .18	36.24 .16	9.55 .28	30.61 .16	60.43 .42	33.31 .16	44.89 .20
16.3	50.48 .19	51.53 .19	36.08 .16	9.26 .29	30.44 .17	60.00 .45	33.14 .17	44.67 .21
26.2	50.28 .18	51.35 .17	35.92 .16	8.98 .28	30.27 .17	59.54 .46	32.97 .17	44.47 .21
Nov. 5.2	50.11 .16	51.18 .15	35.76 .14	8.70 .27	30.10 .16	59.09 .44	32.80 .16	44.26 .20
15.2	49.96 − .13	51.04 − .13	35.63 − .11	8.43 − .25	29.95 − .15	58.67 − .40	32.65 − .14	44.05 − .19
25.2	49.86 − .08	50.92 − .10	35.54 − .07	8.19 − .22	29.81 − .13	58.29 − .36	32.51 − .12	43.87 − .16

Mean Solar Date.	τ Cygni.	ζ Capricor.	74 Cygni.	λ¹ Octantis.	ζ Chamæleontis, S.P.	π² Cygni.	16 Pegasi.	π Pegasi.
	52° 26′ h m 21 10	112° 53′ h m 21 20	50° 5′ h m 21 32	173° 14′ h m 21 33	189° 33′ h m 21 37	41° 12′ h m 21 42	64° 36′ h m 21 48	57° 22′ h m 22 5
	s	s	s	s	s	s	s	s
July 8.6	23.64 + .22	21.53 + .24	31.98 + .21	58.47 +1.41	1.98 − .89	43.74 + .27	2.40 + .24	5.19 + .26
18.6	23.83 .15	21.75 .20	32.17 .18	59.75 1.15	1.22 .68	43.98 .20	2.62 .20	5.43 .21
28.5	23.95 .10	21.93 .16	32.34 .14	60.76 .87	0.65 .48	44.15 .14	2.79 .15	5.62 .16
Aug. 7.5	24.03 + .05	22.06 .10	32.45 .08	61.48 .54	0.27 .26	44.26 .08	2.91 .10	5.76 .11
17.5	24.05 .00	22.13 .05	32.49 + .02	61.84 + .20	0.10 − .05	44.32 + .03	2.99 .06	5.85 .07
27.5	24.03 − .05	22.16 + .01	32.50 − .03	61.88 − .12	0.16 + .19	44.31 − .03	3.03 + .01	5.91 + .03
Sept. 6.4	23.95 .10	22.15 − .03	32.44 .08	61.59 .47	0.49 .43	44.26 .08	3.01 − .04	5.90 − .02
16.4	23.83 .14	22.10 .07	32.34 .12	60.94 .79	1.02 .63	44.15 .14	2.96 .07	5.87 .06
26.4	23.67 .17	22.00 .11	32.20 .15	60.00 1.06	1.76 .84	43.98 .19	2.88 .11	5.79 .10
Oct. 6.4	23.49 .19	21.88 .13	32.03 .18	58.82 1.30	2.70 1.03	43.77 .22	2.76 .14	5.66 .13
16.3	23.28 − .21	21.74 − .15	31.83 − .20	57.41 −1.49	3.81 +1.17	43.55 − .24	2.61 − .15	5.52 − .16
26.3	23.07 .21	21.58 .16	31.62 .21	55.85 1.62	5.04 1.27	43.30 .26	2.45 .16	5.35 .17
Nov. 5.3	22.86 .21	21.42 .15	31.40 .22	54.17 1.67	6.35 1.34	43.03 .27	2.28 .17	5.18 .18
15.2	22.64 .20	21.27 .14	31.18 .21	52.50 1.65	7.71 1.35	42.75 .28	2.11 .16	5.00 .19
25.2	22.44 .19	21.13 .13	30.97 .20	50.87 1.58	9.04 1.30	42.48 .27	1.96 .15	4.81 .17
Dec. 5.2	22.26 − .17	21.01 − .11	30.77 − .19	49.35 −1.46	10.31 +1.23	42.22 − .26	1.82 − .13	4.65 − .15

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	υ Octantis.	γ Aquarii.	σ Aquarii.	α Lacertæ.	10 Lacertæ.	β Octantis.	λ Pegasi.	Groombr. 1706, S.P.
	176° 32′ h m 22 10	91° 57′ h m 22 15	101° 15′ h m 22 24	40° 17′ h m 22 26	51° 32′ h m 22 34	171° 58′ h m 22 34	67° 1′ h m 22 41	348° 22′ h m 22 50
	s	s	s	s	s	s	s	s
July 8.6	27.39 +3.00	56.87 + .26	47.75 + .27	45.09 + .30	18.54 + .28	46.12 +1.39	12.54 + .27	60.00 − .66
18.6	30.19 2.56	57.11 .22	48.00 .23	45.37 .26	18.80 .24	47.46 1.26	12.80 .24	59.42 .50
28.6	32.52 2.05	57.31 .18	48.22 .20	45.62 .21	19.02 .20	48.65 1.07	13.03 .20	58.99 .36
Aug. 7.6	34.30 1.47	57.47 .14	48.40 .15	45.80 .15	19.21 .16	49.60 .82	13.21 .16	58.70 .24
17.5	35.49 .87	57.59 .10	48.53 .10	45.91 .09	19.34 .11	50.30 .56	13.34 .11	58.53 − .10
27.5	36.04 + .22	57.67 + .06	48.61 + .06	45.97 + .04	19.42 + .05	50.73 + .29	13.43 + .07	58.50 + .05
Sept. 6.5	35.94 − .45	57.70 + .02	48.66 + .03	45.99 − .01	19.44 .00	50.88 .00	13.49 + .03	58.62 .21
16.4	35.15 1.08	57.70 − .02	48.67 − .01	45.94 .07	19.43 − .04	50.73 − .30	13.50 − .01	58.93 .38
26.4	33.78 1.67	57.65 .06	48.64 .05	45.83 .12	19.37 .08	50.29 .56	13.46 .05	59.38 .53
Oct. 6.4	31.81 2.23	57.58 .09	48.57 .08	45.69 .16	19.26 .12	49.61 .80	13.40 .08	59.98 .67
16.4	29.32 −2.67	57.48 − .11	48.48 − .10	45.51 − .19	19.13 − .14	48.68 −1.02	13.31 − .11	60.71 + .81
26.3	26.47 3.03	57.37 .12	48.36 .12	45.30 .22	18.98 .16	47.57 1.19	13.18 .13	61.61 .95
Nov. 5.3	23.26 3.27	57.24 .13	48.24 .13	45.06 .25	18.81 .18	46.30 1.32	13.05 . .14	62.62 1.06
15.3	19.93 3.35	57.11 .12	48.11 .13	44.80 .26	18.61 .19	44.93 1.39	12.91 .15	63.72 1.17
25.3	16.56 3.32	56.99 .12	47.98 .12	44.55 .26	18.43 .19	43.52 1.40	12.76 .15	64.93 1.24
Dec. 5.2	13.28 −3.16	56.87 − .11	47.86 − .11	44.29 − .25	18.23 − .19	42.14 −1.35	12.62 − .14	66.19 +1.26
15.2	10.25 −2.85	56.77 − .09	47.75 − .10	44.05 − .23	18.04 − .18	40.82 −1.28	12.49 − .13	67.47 +1.27

Mean Solar Date.	o Androm.	φ Aquarii.	τ Pegasi.	λ Androm.	ι¹ Aquarii.	δ Sculptoris.	γ¹ Octantis.	33 Piscium.
	48° 16′ h m 22 56	96° 39′ h m 23 8	66° 52′ h m 23 15	44° 9′ h m 23 32	108° 54′ h m 23 38	118° 45′ h m 23 43	172° 38′ h m 23 45	96° 20′ h m 23 59
	s	s	s	s	s	s	s	s
July 28.6	51.01 + .23	36.22 + .23	10.43 + .21	10.07 + .28	28.33 + .28	10.32 + .28	39.98 +1.47	40.76 + .25
Aug. 7.6	51.22 .18	36.43 .19	10.63 .19	10.33 .24	28.58 .23	10.58 .24	41.35 1.27	41.00 .23
17.6	51.38 .13	36.60 .15	10.81 .15	10.55 .19	28.79 .18	10.80 .20	42.53 1.05	41.22 .20
27.5	51.49 .08	36.73 .10	10.93 .10	10.71 .13	28.95 .15	10.98 .16	43.44 .77	41.39 .16
Sept. 6.5	51.55 + .03	36.81 .06	11.01 .06	10.81 .08	29.07 .10	11.13 .12	44.07 .48	41.53 .12
16.5	51.56 − .01	36.86 + .03	11.06 + .03	10.88 + .04	29.15 + .05	11.21 + .07	44.40 + .18	41.62 + .08
26.5	51.53 .06	36.87 − .01	11.07 − .01	10.89 − .01	29.19 + .01	11.25 + .03	44.43 − .13	41.69 .04
Oct. 6.4	51.45 .10	36.85 .04	11.04 .05	10.86 .06	29.19 − .01	11.26 − .01	44.14 .44	41.71 + .01
16.4	51.33 .13	36.80 .07	10.98 .08	10.78 .10	29.17 .04	11.23 .05	43.55 .73	41.70 − .02
26.4	51.19 .15	36.71 .09	10.89 .10	10.67 .13	29.11 .07	11.16 .08	42.68 .99	41.67 .04
Nov. 5.3	51.03 − .17	36.60 − .10	10.78 − .12	10.52 − .16	29.02 − .10	11.05 − .11	41.57 −1.21	41.61 − .07
15.3	50.84 .17	36.49 .11	10.65 .13	10.35 .18	28.91 .11	10.94 .12	40.26 1.38	41.53 .09
25.3	50.65 .20	36.38 .12	10.52 .13	10.15 .20	28.79 .12	10.82 .13	38.82 1.50	41.43 .10
Dec. 5.3	50.44 .20	36.26 .11	10.39 .14	9.95 .21	28.67 .12	10.68 .14	37.27 1.56	41.33 .11
15.2	50.25 .19	36.15 .10	10.25 .14	9.74 .22	28.55 .12	10.54 .14	35.70 1.57	41.22 .11
25.2	50.06 − .19	36.06 − .09	10.12 − .13	9.52 − .21	28.43 − .11	10.40 − .13	34.14 −1.51	41.11 − .11
35.2	49.87 − .18	35.98 − .07	10.00 − .12	9.31 − .21	28.32 − .10	10.27 − .12	32.68 −1.41	41.00 − .11

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
Jan. 1	18 50 15.64	16.39	−22 56 58.6	57.8	11.033	+13.94	+ 4 6.57	16 18.40	1 11.05	18 46 9.15
2	18 54 40.27	41.11	22 51 27.2	26.1	11.018	14.38	4 34.64	16 18.40	1 11.00	18 50 5.71
3	18 59 4.52	5.45	22 45 28.4	27.1	11.001	15.51	5 2.34	16 18.39	1 10.95	18 54 2.27
4	19 3 28.36	29.37	22 39 2.5	1.0	10.984	16.64	5 29.63	16 18.38	1 10.90	18 57 58.83
5	19 7 51.76	52.85	22 32 9.7	8.0	10.964	17.75	5 56.47	16 18.36	1 10.84	19 1 55.39
6	19 12 14.67	15.84	−22 24 50.3	48.3	10.943	+18.86	+ 6 22.84	16 18.34	1 10.78	19 5 51.94
7	19 16 37.07	38.31	22 17 4.3	2.0	10.921	19.96	6 48.69	16 18.31	1 10.71	19 9 48.50
8	19 20 58.93	60.24	22 8 52.1	49.5	10.899	21.05	7 13.99	16 18.28	1 10.64	19 13 45.06
9	19 25 20.23	21.61	22 0 13.8	10.9	10.875	22.12	7 38.73	16 18.24	1 10.56	19 17 41.62
10	19 29 40.93	42.38	21 51 9.8	6.6	10.850	23.19	8 2.89	16 18.21	1 10.48	19 21 38.17
11	19 34 1.03	2.55	−21 41 40.3	36.8	10.824	+24.25	+ 8 26.44	16 18.16	1 10.40	19 25 34.73
12	19 38 20.51	22.09	21 31 45.6	41.8	10.798	25.30	8 49.36	16 18.11	1 10.31	19 29 31.29
13	19 42 39.34	40.98	21 21 26.0	21.9	10.771	26.32	9 11.63	16 18.05	1 10.23	19 33 27.85
14	19 46 57.49	59.19	21 10 41.8	37.4	10.743	27.34	9 33.23	16 17.98	1 10.14	19 37 24.40
15	19 51 14.96	16.72	20 59 33.2	28.5	10.714	28.35	9 54.15	16 17.92	1 10.05	19 41 20.96
16	19 55 31.73	33.55	−20 47 60.6	55.5	10.685	+29.34	+10 14.37	16 17.84	1 9.95	19 45 17.51
17	19 59 47.80	49.67	20 35 64.4	59.0	10.655	30.32	10 33.88	16 17.76	1 9.85	19 49 14.07
18	20 4 3.15	5.07	20 23 44.8	39.1	10.625	31.29	10 52.67	16 17.67	1 9.75	19 53 10.63
19	20 8 17.77	19.74	20 10 62.1	56.1	10.595	32.25	11 10.73	16 17.58	1 9.65	19 57 7.19
20	20 12 31.65	33.66	19 57 56.7	50.3	10.564	33.19	11 28.06	16 17.48	1 9.54	20 1 3.74
21	20 16 44.79	46.84	−19 44 29.0	22.3	10.532	+34.11	+11 44.64	16 17.37	1 9.43	20 5 0.29
22	20 20 57.18	59.27	19 30 39.2	32.2	10.500	35.02	12 0.46	16 17.26	1 9.32	20 8 56.85
23	20 25 8.80	10.93	19 16 27.8	20.5	10.468	35.92	12 15.52	16 17.14	1 9.21	20 12 53.41
24	20 29 19.65	21.82	19 1 55.2	47.5	10.436	36.80	12 29.80	16 17.02	1 9.10	20 16 49.97
25	20 33 29.72	31.92	18 46 61.5	53.5	10.404	37.67	12 43.30	16 16.90	1 8.99	20 20 46.53
26	20 37 39.00	41.23	−18 31 47.3	39.0	10.371	+38.51	+12 56.02	16 16.77	1 8.88	20 24 43.08
27	20 41 47.48	49.75	18 16 13.0	4.3	10.338	39.34	13 7.95	16 16.64	1 8.77	20 28 39.63
28	20 45 55.17	57.46	18 0 18.9	9.9	10.304	40.15	13 19.07	16 16.50	1 8.65	20 32 36.19
29	20 50 2.06	4.36	17 43 65.5	56.2	10.270	40.95	13 29.39	16 16.36	1 6.54	20 36 32.75
30	20 54 8.12	10.44	17 27 33.0	23.4	10.236	41.73	13 38.90	16 16.22	1 8.42	20 40 29.30
31	20 58 13.36	15.70	−17 10 42.0	32.1	10.202	+42 50	+13 47.59	16 16.07	1 8.31	20 44 25.85
Feb. 1	21 2 17.78	20.13	16 53 32.8	22.6	10.167	43.25	13 55.44	16 15.92	1 8.19	20 48 22.41
2	21 6 21.38	23.74	16 35 65.9	55.5	10.133	43.97	14 2.47	16 15.77	1 8.08	20 52 18.97
3	21 10 24.14	26.51	16 18 21.7	11.1	10.098	44.69	14 8.67	16 15.62	1 7.96	20 56 15.52
4	21 14 26.07	28.45	16 0 20.5	9.7	10.063	45.38	14 14.04	16 15.46	1 7.85	21 0 12.08
5	21 18 27.18	29.57	−15 41 62.9	51.9	10.029	+46.06	+14 18.58	16 15.30	1 7.73	21 4 8.63
6	21 22 27.46	29.85	15 23 29.4	18.2	9.995	46.72	14 22.30	16 15.13	1 7.62	21 8 5.19
7	21 26 26.92	29.31	15 4 40.2	28.8	9.961	47.36	14 25.19	16 14.96	1 7.50	21 12 1.75
8	21 30 25.56	27.95	14 45 35.8	24.2	9.927	47.99	14 27.27	16 14.79	1 7.39	21 15 58.30
9	21 34 23.38	25.77	14 26 16.7	4.9	9.893	48.60	14 28.54	16 14.61	1 7.28	21 19 54.85
10	21 38 20.41	22.79	−14 6 43.2	31.3	9.860	+49.18	+14 29.01	16 14.43	1 7.17	21 23 51.40
11	21 42 16.65	19.02	13 46 55.9	43.8	9.827	49.75	14 28.69	16 14.24	1 7.06	21 27 47.96
12	21 46 12.12	14.48	13 26 55.0	42.8	9.796	50.31	14 27.59	16 14.05	1 6.95	21 31 44.52
13	21 50 6.83	9.18	13 6 40.9	28.6	9.765	50.86	14 25.73	16 13.86	1 6.85	21 35 41.08
14	21 54 0.79	3.13	12 46 14.2	1.8	9.734	51.37	14 23.13	16 13.66	1 6.74	21 39 37.63
15	21 57 54.01	56.33	−12 25 35.2	22.8	9.704	+51.86	+14 19.79	16 13.46	1 6.64	21 43 34.18
16	22 1 46.51	48.81	−12 4 44.4	31.9	9.674	+52.35	+14 15.73	16 13.25	1 6.53	21 47 30.73

NOTE.—For mean time interval of semidiameter passing meridian, subtract $0^{s}.19$ from the sidereal interval.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
Feb. 16	22 1 46.51	48.81	−12 4 44.4	31.9	9.674	+52.35	+14 15.73	16 13.25	1 6.53	21 47 30.73
17	22 5 38.32	40.60	11 43 42.1	29.6	9.645	52.83	14 10.98	16 13.03	1 6.43	21 51 27.29
18	22 9 29.44	31.70	11 22 28.6	16.1	9.617	53.28	14 5.54	16 12.81	1 6.33	21 55 23.84
19	22 13 19.90	22.14	11 0 64.4	51.9	9.589	53.72	13 59.45	16 12.59	1 6.23	21 59 20.39
20	22 17 9.71	11.92	10 39 29.9	17.4	9.562	54.14	13 52.70	16 12.37	1 6.13	22 3 16.95
21	22 20 58.89	61.07	−10 17 45.5	33.0	9.537	+54.54	+13 45.32	16 12.14	1 6.04	22 7 13.50
22	22 24 47.46	49.61	9 55 51.5	39.1	9.512	54.93	13 37.33	16 11.91	1 5.95	22 11 10.06
23	22 28 35.42	37.55	9 33 48.5	36.1	9 487	55.31	13 28.74	16 11.67	1 5.86	22 15 6.61
24	22 32 22.80	24.90	9 11 36.8	24.4	9.463	55.65	13 19.56	16 11.43	1 5.77	22 19 3.16
25	22 36 9.61	11.68	8 49 16.7	4.4	9.439	55.99	13 9.81	16 11.19	1 5.69	22 22 59.71
26	22 39 55.87	57.91	− 8 26 48.8	36.6	9.416	+56.32	+12 59.52	16 10.95	1 5.61	22 26 56.26
27	22 43 41.60	43.60	8 4 13.3	1.2	9.394	56.62	12 48.70	16 10.71	1 5.53	22 30 52.82
28	22 47 26.80	28.76	7 41 30.8	18.8	9.373	56.91	12 37.35	16 10.47	1 5.45	22 34 49.37
Mar. 1	22 51 11.48	13.41	7 18 41.6	29.7	9.352	57.19	12 25.47	16 10.22	1 5.38	22 38 45.92
2	22 54 55.67	57.57	6 55 46.0	34.2	9.332	57.44	12 13.10	16 9.98	1 5.31	22 42 42.48
3	22 58 39.38	41.24	− 6 32 44.5	32.9	9.312	+57.68	+12 0.25	16 9.73	1 5.24	22 46 39.03
4	23 2 22.62	24.44	6 9 37.6	26.2	9.293	57.89	11 46.94	16 9.48	1 5.17	22 50 35.58
5	23 6 5.42	7.20	5 46 25.7	14.5	9.274	58.09	11 33.18	16 9.23	1 5.10	22 54 32.13
6	23 9 47.78	49.52	5 22 69.2	58.2	9 256	58.28	11 18.98	16 8.98	1 5.04	22 58 28.69
7	23 13 29.72	31.42	4 59 48.4	37.6	9.240	58.44	11 4.36	16 8.73	1 4.99	23 2 25.25
8	23 17 11.25	12.91	− 4 36 23.8	13.2	9.224	+58.59	+10 49.35	16 8.47	1 4.94	23 6 21.80
9	23 20 52.41	54.03	4 12 55.8	45.4	9.208	58.73	10 33.96	16 8.21	1 4.89	23 10 18.35
10	23 24 33.22	34.80	3 49 24.8	14.6	9.193	58.84	10 18.21	16 7.95	1 4.84	23 14 14.90
11	23 28 13.68	15.22	3 25 51.0	41.1	9.179	58.95	10 2.12	16 7.69	1 4.80	23 18 11.45
12	23 31 53.81	55.31	3 2 15.0	5.3	9.166	59.03	9 45.70	16 7.43	1 4.75	23 22 8.00
13	23 35 33.66	35.11	− 2 38 37.1	27.7	9.155	+59.10	+ 9 28.99	16 7.17	1 4.71	23 26 4.55
14	23 39 13.24	14.65	2 14 57.7	48.6	9.144	59.17	9 12.02	16 6.91	1 4.67	23 30 1.11
15	23 42 52.57	53.93	1 51 17.0	8.2	9.134	59.22	8 54.80	16 6.64	1 4.64	23 33 57.66
16	23 46 31.67	32.99	1 27 35.4	26.9	9.125	59.24	8 37.35	16 6.37	1 4.61	23 37 54.22
17	23 50 10.57	11.85	1 3 53.4	45.2	9.118	59.25	8 19.70	16 6.10	1 4.58	23 41 50.77
18	23 53 49.29	50.52	− 0 40 11.3	3.4	9.111	+59.25	+ 8 1.87	16 5.83	1 4.56	23 45 47.32
19	23 57 27.87	29.04	− 0 16 29.3	21.7	9.105	59.24	7 43.90	16 5.55	1 4.54	23 49 43.87
20	0 1 6.32	7.44	+ 0 7 12.2	19.5	9.100	59.21	7 25.80	16 5.27	1 4.52	23 53 40.42
21	0 4 44.66	45.74	0 30 52.8	59.8	9.096	59.17	7 7.59	16 4.99	1 4.50	23 57 36.97
22	0 8 22.92	23.96	0 54 32.2	38.9	9.093	59.11	6 49.31	16 4.71	1 4.49	0 1 33.52
23	0 12 1.13	2.12	+ 1 18 10.0	16.4	9.091	+59.03	+ 6 30.97	16 4.43	1 4.48	0 5 30.08
24	0 15 39.29	40.23	1 41 45.9	52.0	9.090	58.95	6 12.58	16 4.15	1 4.47	0 9 26.64
25	0 19 17.43	18.32	2 5 19.7	25.5	9.089	58.85	5 54.16	16 3.86	1 4.47	0 13 23.19
26	0 22 55.57	56.41	2 28 50.9	56.4	9.089	58.74	5 35.75	16 3.58	1 4.47	0 17 19.74
27	0 26 33.73	34.53	2 52 19.1	24.3	9.090	58.61	5 17.36	16 3.30	1 4.47	0 21 16.29
28	0 30 11.92	12.67	+ 3 15 44.0	48.8	9.092	+58.46	+ 4 59.00	16 3.02	1 4.47	0 25 12.85
29	0 33 50.17	50.88	3 39 5.1	9.6	9.095	58.29	4 40.70	16 2.73	1 4.47	0 29 9.40
30	0 37 28.50	29.16	4 2 22.2	26.4	9.098	58.11	4 22.48	16 2.45	1 4.48	0 33 5.95
31	0 41 6.91	7.53	4 25 34.9	38.8	9.102	57.92	4 4.35	16 2.17	1 4.49	0 37 2.50
32	0 44 45.41	45.99	4 48 43.0	46.6	9.107	57.71	3 46.31	16 1.89	1 4.51	0 40 59.05
33	0 48 24.03	24.56	+ 5 11 45.9	49.2	9.113	+57.49	+ 3 28.38	16 1.61	1 4.53	0 44 55.61
34	0 52 2.78	3.26	+ 5 34 43.2	46.2	9.118	+57.26	+ 3 10.58	16 1.33	1 4.56	0 48 52.16

Note.—For mean time interval of semidiameter passing meridian, subtract $0^{s}.18$ from the sidereal interval.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
Apr. 1	0 44 45.41	45.99	+ 4 48 43.0	46.6	9.107	+57.71	+3 46.31	16 1.89	1 4.51	0 40 59.05
2	0 48 24.03	24.56	5 11 45.9	49.2	9.113	57.49	3 28.38	16 1.61	1 4.53	0 44 55.61
3	0 52 2.78	3.26	5 34 43.2	46.2	9.118	57.26	3 10.58	16 1.33	1 4.56	0 48 52.16
4	0 55 41.69	42.13	5 57 34.6	37.3	9.124	57.00	2 52.93	16 1.06	1 4.59	0 52 48.71
5	0 59 20.75	21.14	6 20 19.7	22.1	9.132	56.74	2 35.45	16 0.79	1 4.62	0 56 45.27
6	1 2 59.99	60.34	+ 6 42 58.2	60.3	9.140	+56.46	+2 18.15	16 0.52	1 4.65	1 0 41.82
7	1 6 39.43	39.73	7 5 29.8	31.6	9.148	56.16	2 1.04	16 0.25	1 4.68	1 4 38.37
8	1 10 19.08	19.34	7 27 54.2	55.7	9.157	55.85	1 44.14	15 59.98	1 4.71	1 8 34.92
9	1 13 58.96	59.18	7 50 10.8	12.1	9.167	55.53	1 27.48	15 59.71	1 4.75	1 12 31.48
10	1 17 39.10	39.28	8 12 19.4	20.5	9.178	55.19	1 11.06	15 59.45	1 4.79	1 16 28.03
11	1 21 19.51	19.65	+ 8 34 19.7	20.5	9.190	+54.83	+0 54.92	15 58.18	1 4.83	1 20 24.59
12	1 25 0.20	0.30	8 56 11.3	11.9	9.202	54.46	0 39.06	15 58.91	1 4.88	1 24 21.14
13	1 28 41.20	41.26	9 17 53.9	54.3	9.215	54.08	0 23.51	15 58.64	1 4.93	1 28 17.69
14	1 32 22.52	22.54	9 39 27.1	27.3	9.229	53.68	+0 8.28	15 58.38	1 4.98	1 32 14.24
15	1 36 4.18	4.16	10 0 50.7	50.7	9.244	53.28	−0 6.61	15 58.11	1 5.03	1 36 10.80
16	1 39 46.21	46.15	+10 22 4.5	4.3	9.259	+52.86	−0 21.14	15 57.85	1 5.09	1 40 7.35
17	1 43 28.63	28.53	10 43 8.1	7.7	9.276	52.42	0 35.28	15 57.58	1 5.14	1 44 3.91
18	1 47 11.44	11.31	11 4 1.1	0.5	9.293	51.97	0 49.01	15 57.32	1 5.20	1 48 0.47
19	1 50 54.67	54.51	11 24 43.2	42.4	9.311	51.52	1 2.33	15 57.05	1 5.26	1 51 57.02
20	1 54 38.34	38.14	11 45 14.2	13.2	9.329	51.05	1 15.21	15 56.79	1 5.32	1 55 53.57
21	1 58 22.46	22.23	+12 5 33.7	32.6	9.348	+50.56	−1 27.64	15 56.53	1 5.38	1 59 50.12
22	2 2 7.04	6.78	12 25 41.3	40.1	9.367	50.06	1 39.61	15 56.27	1 5.45	2 3 46.67
23	2 5 52.10	51.81	12 45 36.9	35.5	9.387	49.55	1 51.11	15 56.01	1 5.51	2 7 43.23
24	2 9 37.65	37.33	13 5 20.0	18.4	9.408	49.03	2 2.12	15 55.75	1 5.58	2 11 39.79
25	2 13 23.69	23.34	13 24 50.3	48.6	9.429	48.49	2 12.63	15 55.50	1 5.65	2 15 36.34
26	2 17 10.24	9.86	+13 44 7.6	5.8	9.450	+47.94	−2 22.63	15 55.25	1 5.72	2 19 32.89
27	2 20 57.30	56.90	14 3 11.4	9.5	9.471	47.38	2 32.12	15 55.00	1 5.80	2 23 29.44
28	2 24 44.88	44.46	14 21 61.4	59.4	9.494	46.80	2 41.09	15 54.75	1 5.88	2 27 26.00
29	2 28 32.98	32.54	14 40 37.3	35.2	9.516	46.21	2 49.54	15 54.51	1 5.96	2 31 22.55
30	2 32 21.62	21.15	14 58 58.7	56.5	9.538	45.59	2 57.46	15 54.27	1 6.04	2 35 19.10
May 1	2 36 10.79	10.30	+15 17 5.3	3.1	9.560	+44.97	−3 4.84	15 54.03	1 6.12	2 39 15.66
2	2 39 60.50	59.99	15 34 56.8	54.5	9.583	44.32	3 11.69	15 53.80	1 6.20	2 43 12.21
3	2 43 50.75	50.22	15 52 32.8	30.5	9.605	43.67	3 18.00	15 53.57	1 6.28	2 47 8.76
4	2 47 41.54	41.00	16 9 53.0	50.6	9.628	43.00	3 23.77	15 53.35	1 6.37	2 51 5.32
5	2 51 32.87	32.31	16 26 57.1	54.7	9.650	42.32	3 29.00	15 53.13	1 6.45	2 55 1.87
6	2 55 24.74	24.17	+16 43 44.7	42.3	9.673	+41.63	−3 33.68	15 52.91	1 6.53	2 58 58.43
7	2 59 17.17	16.59	17 0 15.5	13.1	9 696	40.93	3 37.81	15 52.69	1 6.61	3 2 54.99
8	3 3 10.16	9.56	17 16 29.3	26.9	9.719	40.21	3 41.38	15 52.49	1 6.69	3 6 51.55
9	3 7 3.70	3.09	17 32 25.8	23.4	9.742	39.48	3 44.39	15 52.28	1 6.77	3 10 48.13
10	3 10 57.79	57.17	17 48 4.6	2.2	9.766	38.74	3 46.86	15 52.08	1 6.85	3 14 44.66
11	3 14 52.44	51.81	+18 3 25.4	23.0	9.789	+37.99	−3 48.77	15 51.87	1 6.93	3 18 41.22
12	3 18 47.66	47.03	18 18 28.0	25.6	9.813	37.23	3 50.11	15 51.67	1 7.01	3 22 37.77
13	3 22 43.45	42.82	18 33 12.1	9.7	9.836	36.45	3 50.88	15 51.47	1 7.09	3 26 34.33
14	3 26 39.80	39.17	18 47 37.5	35.2	9.860	35.66	3 51.08	15 51.27	1 7.17	3 30 30.88
15	3 30 36.72	36.09	19 1 43.9	41.6	9.883	34.87	3 50.71	15 51.07	1 7.25	3 34 27.44
16	3 34 34.21	33.58	+19 15 31.0	28.8	9.907	+34.06	−3 49.78	15 50.88	1 7.34	3 38 23.99
17	3 38 32.27	31.64	+19 28 58.5	56.4	9.931	+33.24	−3 48.28	15 50.69	1 7.42	3 42 20.55

NOTE.—For mean time interval of semidiameter passing meridian, subtract $0^{s}.18$ from the sidereal interval.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Decli-nation.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
May 17	3 38 32.27	31.64	+19 28 58.5	56.4	9.931	+33.24	−3 48.28	15 50.69	1 7.42	3 42 20.55
18	3 42 30.90	30.28	19 42 6.3	4.2	9.955	32.41	3 46.21	15 50.50	1 7.50	3 46 17.10
19	3 46 30.10	29.48	19 54 54.1	52.1	9.979	31.57	3 43.57	15 50.31	1 7.58	3 50 13.66
20	3 50 29.86	29.25	20 7 21.6	19.7	10.002	30.72	3 40.37	15 50.12	1 7.65	3 54 10.21
21	3 54 30.17	29.57	20 19 28.6	26.8	10.025	29.85	3 36.61	15 49.94	1 7.73	3 58 6.77
22	3 58 31.03	30.44	+20 31 14.9	13.1	10.048	+28.98	−3 32.30	15 49.76	1 7.80	4 2 3.33
23	4 2 32.44	31.86	20 42 40.1	38.4	10.070	28.11	3 27.45	15 49.58	1 7.87	4 5 59.88
24	4 6 34.39	33.82	20 53 44.1	42.5	10.092	27.22	3 22.07	15 49.41	1 7.94	4 9 56.44
25	4 10 36.85	36.29	21 4 26.7	25.2	10.113	26.32	3 16.16	15 49.25	1 8.01	4 13 53.00
26	4 14 39.81	39.27	21 14 47.5	46.1	10.134	25.42	3 9.75	15 49.09	1 8.08	4 17 49.55
27	4 18 43.26	42.74	+21 24 46.4	45.1	10.154	+24.50	−3 2.85	15 48.93	1 8.15	4 21 46.11
28	4 22 47.19	46.69	21 34 23.2	22.0	10.173	23.57	2 55.48	15 48.78	1 8.21	4 25 42.67
29	4 26 51.58	51.10	21 43 37.6	36.5	10.192	22.63	2 47.66	15 48.63	1 8.27	4 29 39.23
30	4 30 56.40	55.95	21 52 29.4	28.4	10.210	21.68	2 39.39	15 48.49	1 8.33	4 33 35.78
31	4 35 1.65	1.22	22 0 58.4	57.5	10.227	20.72	2 30.70	15 48.35	1 8.39	4 37 32.34
June 1	4 39 7.31	6.90	+22 9 4.4	3.6	10.243	+19.76	−2 21.61	15 48.21	1 8.45	4 41 28.90
2	4 43 13.33	12.95	22 16 47.2	46.5	10.258	18.79	2 12.14	15 48.08	1 8.50	4 45 25.45
3	4 47 19.71	19.36	22 24 6.7	6.1	10.273	17.82	2 2.31	15 47.96	1 8.55	4 49 22.01
4	4 51 26.43	26.11	22 31 2.6	2.1	10.287	16.84	1 52.14	15 47.85	1 8.60	4 53 18.57
5	4 55 33.48	33.19	22 37 34.9	34.5	10.300	15.85	1 41.65	15 47.74	1 8.65	4 57 15.12
6	4 59 40.82	40.56	+22 43 43.3	43.0	10.312	+14.86	−1 30.87	15 47.63	1 8.69	5 1 11.68
7	5 3 48.44	48.21	22 49 27.8	27.5	10.323	13.86	1 19.81	15 47.52	1 8.73	5 5 8.24
8	5 7 56.32	56.12	22 54 48.2	47.9	10.333	12.85	1 8.48	15 47.42	1 8.77	5 9 4.80
9	5 12 4.45	4.29	22 59 44.5	44.3	10.343	11.84	0 56.91	15 47.33	1 8.81	5 13 1.35
10	5 16 12.80	12.67	23 4 16.5	16.3	10.352	10.83	0 45.12	15 47.24	1 8.84	5 16 57.91
11	5 20 21.35	21.26	+23 8 24.1	23.9	10.360	+ 9.81	−0 33.13	15 47.15	1 8.87	5 20 54.47
12	5 24 30.09	30.03	23 12 7.2	7.1	10.367	8.79	0 20.95	15 47.06	1 8.89	5 24 51.03
13	5 28 39.00	38.98	23 15 25.9	25.9	10.374	7.77	−0 8.60	15 46.97	1 8.91	5 28 47.59
14	5 32 48.06	48.07	23 18 20.0	20.0	10.380	6.74	+0 3.90	15 46.88	1 8.93	5 32 44.15
15	5 36 57.25	57.30	23 20 49.4	49.4	10.385	5.71	0 16.54	15 46.80	1 8.94	5 36 40.70
16	5 41 6.55	6.64	+23 22 54.1	54.1	10.390	+ 4.68	+0 29.29	15 46.73	1 8.96	5 40 37.26
17	5 45 15.95	16.07	23 24 34.2	34.2	10.393	3.66	0 42.13	15 46.66	1 8.97	5 44 33.82
18	5 49 25.42	25.57	23 25 49.6	49.6	10.395	2.63	0 55.05	15 46.59	1 8.97	5 48 30.38
19	5 53 34.94	35.13	23 26 40.2	40.2	10.397	1.60	1 8.01	15 46.53	1 8.97	5 52 26.93
20	5 57 44.48	44.71	23 27 6.0	6.0	10.398	+ 0.57	1 21.00	15 46.47	1 8.97	5 56 23.49
21	6 1 54.04	54.31	+23 27 7.1	7.1	10.398	− 0.46	+1 34.00	15 46.41	1 8.97	6 0 20.05
22	6 6 3.58	3.89	23 26 43.5	43.5	10.397	1.50	1 46.98	15 46.36	1 8.97	6 4 16.61
23	6 10 13.08	13.43	23 25 55.0	55.0	10.394	2.53	1 59.92	15 46.31	1 8.96	6 8 13.16
24	6 14 22.51	22.89	23 24 41.7	41.6	10.390	3.57	2 12.79	15 46.27	1 8.95	6 12 9.72
25	6 18 31.83	32.25	23 23 3.8	3.6	10.386	4.60	2 25.57	15 46.23	1 8.93	6 16 6.28
26	6 22 41.04	41.49	+23 21 1.2	1.0	10.380	− 5.62	+2 38.22	15 46.20	1 8.91	6 20 2.84
27	6 26 50.11	50.60	23 18 34.0	33.7	10.373	6.64	2 50.74	15 46.18	1 8.88	6 23 59.39
28	6 30 59.00	59.52	23 15 42.2	41.9	10.365	7.66	3 3.07	15 46.16	1 8.85	6 27 55.95
29	6 35 7.68	8.24	23 12 25.9	25.5	10.357	8.68	3 15.20	15 46.14	1 8.82	6 31 52.51
30	6 39 16.14	16.73	23 8 45.2	44.7	10.347	9.70	3 27.10	15 46.13	1 8.79	6 35 49.07
31	6 43 24.35	24.98	+23 4 40.2	39.6	10.336	−10.71	+3 38.76	15 46.13	1 8.76	6 39 45.62
32	6 47 32.28	32.94	+23 0 11.0	10.3	10.324	−11.72	+3 50.13	15 46.13	1 8.72	6 43 42.18

NOTE.—For mean time interval of semidiameter passing meridian, subtract $0^{s}.19$ from the sidereal interval.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
July 1	6 43 24.35	24.98	+23 4 40.2	39.6	10.336	−10.71	+3 38.76	15 46.13	1 8.76	6 39 45.62
2	6 47 32.28	32.94	23 0 11.0	10.3	10.324	11.72	3 50.13	15 46.13	1 8.72	6 43 42.18
3	6 51 39.90	40.59	22 55 17.8	17.0	10.311	12.73	4 1.18	15 46.14	1 8.68	6 47 38.74
4	6 55 47.19	47.91	22 49 60.5	59.5	10.297	13.72	4 11.92	15 46.15	1 8.64	6 51 35.30
5	6 59 54.14	54.89	22 44 19.4	18.3	10.282	14.70	4 22.32	15 46.16	1 8.59	6 55 31.85
6	7 4 0.72	1.50	+22 38 14.6	13.4	10.266	−15.69	+4 32.34	15 46.18	1 8.54	6 59 28.41
7	7 8 6.92	7.73	22 31 46.3	45.0	10.249	16.67	4 41.98	15 46.21	1 8.49	7 3 24.97
8	7 12 12.71	13.54	22 24 54.6	53.3	10.232	17.64	4 51.21	15 46.24	1 8.44	7 7 21.53
9	7 16 18.08	18.93	22 17 39.9	38.3	10.215	18.60	5 0.03	15 46.27	1 8.38	7 11 18.08
10	7 20 23.02	23.89	22 10 1.8	0.1	10.197	19.55	5 8.41	15 46.30	1 8.32	7 15 14.64
11	7 24 27.52	28.41	+22 1 61.0	59.2	10.178	−20.50	+5 16.35	15 46.34	1 8.26	7 19 11.20
12	7 28 31.56	32.47	21 53 37.6	35.6	10.159	21.44	5 23.83	15 46.38	1 8.20	7 23 7.76
13	7 32 35.13	36.06	21 44 51.6	49.5	10.139	22.38	5 30.85	15 46.43	1 8.13	7 27 4.31
14	7 36 38.22	39.17	21 35 43.3	41.1	10.119	23.30	5 37.39	15 46.48	1 8.06	7 31 0.87
15	7 40 40.83	41.79	21 26 13.1	10.8	10.099	24.21	5 43.43	15 46.53	1 7.99	7 34 57.43
16	7 44 42.95	43.92	+21 16 21.0	18.6	10.078	−25.12	+5 48.98	15 46.58	1 7.92	7 38 53.99
17	7 48 44.56	45.55	21 6 7.1	4.6	10.056	26.02	5 54.03	15 46.64	1 7.84	7 42 50.55
18	7 52 45.65	46.65	20 55 31.8	29.1	10.034	26.91	5 58.56	15 46.70	1 7.76	7 46 47.10
19	7 56 46.21	47.22	20 44 35.3	32.5	10.012	27.79	6 2.57	15 46.77	1 7.68	7 50 43.65
20	8 0 46.25	47.27	20 33 17.9	15.0	9.990	28.65	6 6.05	15 46.85	1 7.60	7 54 40.21
21	8 4 45.76	46.78	+20 21 39.7	36.7	9.967	−29.51	+6 9.00	15 46.93	1 7.52	7 58 36.77
22	8 8 44.72	45.74	20 9 40.9	37.8	9.944	30.37	6 11.40	15 47.01	1 7.44	8 2 33.33
23	8 12 43.11	44.14	19 57 21.8	18.6	9.921	31.22	6 13.24	15 47.09	1 7.36	8 6 29.88
24	8 16 40.93	41.97	19 44 42.8	39.5	9.898	32.05	6 14.51	15 47.18	1 7.28	8 10 26.43
25	8 20 38.18	39.21	19 31 44.0	40.6	9.874	32.86	6 15.20	15 47.28	1 7.19	8 14 22.99
26	8 24 34.84	35.87	+19 18 25.6	22.1	9.850	−33.66	+6 15.30	15 47.38	1 7.11	8 18 19.55
27	8 28 30.92	31.94	19 4 48.1	44.5	9.825	34.46	6 14.81	15 47.48	1 7.02	8 22 16.11
28	8 32 26.40	27.42	18 50 51.7	48.0	9.800	35.24	6 13.73	15 47.60	1 6.94	8 26 12.67
29	8 36 21.27	22.28	18 36 36.6	32.9	9.774	36.01	6 12.05	15 47.72	1 6.85	8 30 9.22
30	8 40 15.52	16.52	18 21 63.1	59.4	9.748	36.77	6 9.75	15 47.84	1 6.76	8 34 5.77
31	8 44 9.16	10.15	+18 7 11.6	7.8	9.722	−37.52	+6 6.82	15 47.96	1 6.67	8 38 2.33
Aug. 1	8 48 2.18	3.16	17 51 62.3	58.4	9.696	38.25	6 3.28	15 48.09	1 6.58	8 41 58.89
2	8 51 54.58	55.55	17 36 35.6	31.7	9.670	38.97	5 59.12	15 48.23	1 6.50	8 45 55.45
3	8 55 46.35	47.31	17 20 51.8	47.9	9.644	39.68	5 54.34	15 48.37	1 6.41	8 49 52.00
4	8 59 37.51	38.45	17 4 51.1	47.2	9.618	40.38	5 48.94	15 48.51	1 6.33	8 53 48.55
5	9 3 28.05	28.97	+16 48 33.7	29.8	9.593	−41.06	+5 42.92	15 48.66	1 6.24	8 57 45.11
6	9 7 17.97	18.87	16 31 60.0	56.1	9.568	41.73	5 36.29	15 48.81	1 6.16	9 1 41.66
7	9 11 7.29	8.17	16 15 10.5	6.6	9.543	42.39	5 29.05	15 48.96	1 6.07	9 5 38.21
8	9 14 56.01	56.87	15 58 5.4	1.6	9.518	43.04	5 21.21	15 49.12	1 5.99	9 9 34.77
9	9 18 44.14	44.97	15 40 44.9	41.1	9.494	43.67	5 12.79	15 49.28	1 5.90	9 13 31.33
10	9 22 31.69	32.49	+13 23 9.3	5.6	9.470	−44.29	+5 3.78	15 49.45	1 5.82	9 17 27.88
11	9 26 18.67	19.44	15 5 19.0	15.3	9.446	44.90	4 54.20	15 49.62	1 5.74	9 21 24.44
12	9 30 5.09	5.83	14 47 14.2	10.6	9.423	45.50	4 44.07	15 49.79	1 5.66	9 25 21.00
13	9 33 50.96	51.67	14 28 55.3	51.8	9.400	46.08	4 33.39	15 49.96	1 5.58	9 29 17.55
14	9 37 36.30	36.98	14 10 22.6	19.2	9.379	46.65	4 22.17	15 50.13	1 5.50	9 33 14.10
15	9 41 21.12	21.77	+13 51 36.3	33.0	9.358	−47.21	+4 10.43	15 50.30	1 5.42	9 37 10.66
16	9 45 5.43	6.05	+13 32 36.7	33.5	9.337	−47.76	+3 58.19	15 50.48	1 5.34	9 41 7.22

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0s.18 from the sidereal interval.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Decli-nation.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
Aug. 16	9 45 5.43	6.05	+13 32 36.7	33.5	9.337	−47.76	+ 3 58.19	15 50.48	1 5.34	9 41 7.22
17	9 48 49.25	49.84	13 13 24.2	21.1	9.317	48.29	3 45.45	15 50.66	1 5.27	9 45 3.77
18	9 52 32.59	33.14	12 53 59.0	56.1	9.296	48.81	3 32.24	15 50.85	1 5.20	9 49 0.32
19	9 56 15.45	15.96	12 34 21.3	18.7	9.276	49.32	3 18.56	15 51.03	1 5.13	9 52 56.87
20	9 59 57.85	58.32	12 14 31.7	29.1	9.257	49.82	3 4.40	15 51.22	1 5.06	9 56 53.43
21	10 3 39.80	40.23	+11 54 30.3	27.8	9.239	−50.30	+ 2 49.79	15 51.41	1 4.99	10 0 49.99
22	10 7 21.31	21.70	11 34 17.5	15.2	9.221	50.77	2 34.74	15 51.61	1 4.93	10 4 46.54
23	10 11 2.39	2.74	11 13 53.7	51.6	9.203	51.23	2 19.27	15 51.81	1 4.86	10 8 43.10
24	10 14 43.05	43.36	10 53 19.1	17.2	9.186	51.67	2 3.38	15 52.02	1 4.80	10 12 39.65
25	10 18 23.31	23.58	10 32 34.0	32.3	9.170	52.09	1 47.09	15 52.23	1 4.75	10 16 36.21
26	10 22 3.18	3.41	+10 11 38.7	37.3	9.154	−52.51	+ 1 30.41	15 52.45	1 4.68	10 20 32.76
27	10 25 42.66	42.85	9 50 33.7	32.5	9.138	52.91	1 13.34	15 52.67	1 4.62	10 24 29.31
28	10 29 21.77	21.91	9 29 19.4	18.5	9.122	53.29	0 55.90	15 52.89	1 4.57	10 28 25.86
29	10 33 0.51	0.61	9 7 56.0	55.3	9.107	53.66	0 38.10	15 53.11	1 4.52	10 32 22.41
30	10 36 38.91	38.96	8 46 23.8	23.4	9.093	54.01	0 19.95	15 53.34	1 4.47	10 36 18.97
31	10 40 16.97	16.98	+ 8 24 43.3	43.2	9.079	−54.35	+ 0 1.45	15 53.57	1 4.42	10 40 15.53
Sept. 1	10 43 54.71	54.67	8 2 54.7	55.0	9.066	54.68	− 0 17.37	15 53.81	1 4.38	10 44 12.08
2	10 47 32.14	32.05	7 40 58.4	59.0	9.054	55.00	0 36.48	15 54.05	1 4.34	10 48 8.63
3	10 51 9.29	9.15	7 18 54.7	55.6	9.043	55.31	0 55.88	15 54.29	1 4.30	10 52 5.18
4	10 54 46.18	45.99	6 56 43.9	45.1	9.032	55.60	1 15.55	15 54.53	1 4.26	10 56 1.74
5	10 58 22.82	22.58	+ 6 34 26.4	27.9	9.022	−55.87	− 1 35.46	15 54.78	1 4.23	10 59 58.29
6	11 1 59.22	58.93	6 12 2.5	4.3	9.013	56.12	1 55.60	15 55.03	1 4.21	11 3 54.84
7	11 5 35.42	35.08	5 49 32.6	34.7	9.005	56.37	2 15.94	15 55.28	1 4.19	11 7 51.39
8	11 9 11.43	11.04	5 26 56.9	59.3	8.998	56.61	2 36.48	15 55.53	1 4.16	11 11 47.95
9	11 12 47.28	46.84	5 4 15.7	18.5	8.991	56.82	2 57.18	15 55.78	1 4.14	11 15 44.50
10	11 16 22.98	22.49	+ 4 41 29.3	32.5	8.986	−57.03	− 3 18.03	15 56.03	1 4.12	11 19 41.05
11	11 19 58.57	58.03	4 18 38.2	41.7	8.981	57.23	3 38.98	15 56.28	1 4.10	11 23 37.60
12	11 23 34.06	33.47	3 55 42.5	46.3	8.978	57.41	4 0.03	15 56.53	1 4.08	11 27 34.15
13	11 27 9.48	8.83	3 32 42.5	46.7	8.976	57.57	4 21.16	15 56.79	1 4.07	11 31 30.70
14	11 30 44.85	44.15	3 9 38.7	43.2	8.974	57.73	4 42.34	15 57.04	1 4.06	11 35 27.26
15	11 34 20.19	19.44	+ 2 46 31.3	36.2	8.973	−57.88	− 5 3.55	15 57.30	1 4.05	11 39 23.81
16	11 37 55.53	54.73	2 23 20.5	25.8	8.973	58.01	5 24.77	15 57.56	1 4.05	11 43 20.37
17	11 41 30.88	30.02	2 0 6.8	12.4	8.974	58.12	5 45.97	15 57.82	1 4.05	11 47 16.93
18	11 45 6.25	5.34	1 36 50.5	56.4	8.976	58.23	6 7.13	15 58.08	1 4.05	11 51 13.48
19	11 48 41.68	40.72	1 13 31.8	38.1	8.979	58.32	6 28.24	15 58.34	1 4.06	11 55 10.03
20	11 52 17.20	16.19	+ 0 50 11.1	17.8	8.982	−58.39	− 6 49.27	15 58.60	1 4.07	11 59 6.58
21	11 55 52.82	51.75	0 26 48.8	55.8	8.986	58.45	7 10.21	15 58.86	1 4.08	12 3 3.14
22	11 59 28.53	27.41	+ 0 3 25.2	32.5	8.991	58.50	7 31.04	15 59.13	1 4.09	12 6 59.69
23	12 3 4.37	3.20	− 0 19 59.3	51.7	8.996	58.53	7 51.76	15 59.40	1 4.11	12 10 56.24
24	12 6 40.35	39.13	0 43 24.4	16.4	9.002	58.55	8 12.32	15 59.67	1 4.14	12 14 52.79
25	12 10 16.50	15.22	− 1 6 49.6	41.2	9.010	−58.55	− 8 32.72	15 59.94	1 4.17	12 18 49.34
26	12 13 52.82	51.49	1 30 14.7	5.9	9.018	58.53	8 52.96	16 0.22	1 4.20	12 22 45.90
27	12 17 29.33	27.95	1 53 39.1	30.0	9.026	58.50	9 13.01	16 0.50	1 4.23	12 26 42.45
28	12 21 6.05	4.62	2 16 62.7	53.3	9.035	58.46	9 32.83	16 0.78	1 4.26	12 30 39.00
29	12 24 43.00	41.51	2 40 25.0	15.3	9.045	58.39	9 52.42	16 1.06	1 4.30	12 34 35.55
30	12 28 20.19	18.65	− 3 3 45.7	35.7	9.055	−58.31	−10 11.78	16 1.34	1 4.34	12 38 32.10
31	12 31 57.65	56.06	− 3 26 64.2	54.0	9.067	−58.22	−10 30.87	16 1.62	1 4.38	12 42 28.66

NOTE.—For mean time interval of semidiameter passing meridian, subtract $0^{s}.18$ from the sidereal interval.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
Oct. 1	12 31 57.65	56.06	− 3 26 64.2	54.0	9.067	−58.22	−10 30.87	16 1.62	1 4.38	12 42 28.66
2	12 35 35.40	33.76	3 50 20.4	9.9	9.079	58.11	10 49.67	16 1.90	1 4.43	12 46 25.21
3	12 39 13.46	11.77	4 13 33.7	23.0	9.092	57.99	11 8.17	16 2.19	1 4.48	12 50 21.76
4	12 42 51.84	50.10	4 36 43.9	32.9	9.106	57.86	11 26.34	16 2.48	1 4.53	12 54 18.32
5	12 46 30.57	28.78	4 59 50.6	39.4	9.121	57.70	11 44.16	16 2.76	1 4.59	12 58 14.87
6	12 50 9.67	7.83	− 5 22 53.6	42.1	9.138	−57.53	−12 1.62	16 3.04	1 4.65	13 2 11.43
7	12 53 49.16	47.28	5 45 52.3	40.6	9.155	57.35	12 18.67	16 3.32	1 4.71	13 6 7.98
8	12 57 29.07	27.14	6 8 46.4	34.5	9.173	57.16	12 35.31	16 3.60	1 4.77	13 10 4.53
9	13 1 9.42	7.45	6 31 35.6	23.5	9.191	56.94	12 51.52	16 3.88	1 4.84	13 14 1.08
10	13 4 50.23	48.21	6 54 19.7	7.4	9.211	56.72	13 7.27	16 4.16	1 4.91	13 17 57.64
11	13 8 31.53	29.47	− 7 16 58.2	45.7	9.232	−56.48	−13 22.52	16 4.43	1 4.98	13 21 54.19
12	13 12 13.34	11.24	7 39 30.8	18.1	9.254	56.22	13 37.26	16 4.70	1 5.06	13 25 50.74
13	13 15 55.67	53.53	8 1 57.0	44.1	9.276	55.95	13 51.49	16 4.97	1 5.14	13 29 47.29
14	13 19 38.55	36.37	8 24 16.5	3.4	9.299	55.67	14 5.16	16 5.24	1 5.22	13 33 43.85
15	13 23 22.00	19.78	8 46 29.1	15.9	9.323	55.37	14 18.26	16 5.51	1 5.30	13 37 40.40
16	13 27 6.04	3.78	− 9 8 34.3	21.0	9.348	−55.06	−14 30.77	16 5.78	1 5.38	13 41 36.95
17	13 30 50.70	48.40	9 30 31.8	18.4	9.374	54.73	14 42.67	16 6.04	1 5.47	13 45 33.51
18	13 34 35.99	33.65	9 52 21.1	7.6	9.400	54.37	14 53.95	16 6.31	1 5.56	13 49 30.06
19	13 38 21.91	19.54	10 13 61.9	48.3	9.427	54.01	15 4.59	16 6.57	1 5.65	13 53 26.61
20	13 42 8.48	6.07	10 35 33.9	20.2	9.454	53 63	15 14.58	16 6.84	1 5.74	13 57 23.17
21	13 45 55.71	53.27	−10 56 56.5	42.8	9.482	−53.23	−15 23.91	16 7.10	1 5.84	14 1 19.72
22	13 49 43.63	41.16	11 17 69.3	55.6	9.510	52.82	15 32.56	16 7.37	1 5.94	14 5 16.28
23	13 53 32.25	29.75	11 38 72.0	58.3	9.539	52.38	15 40.50	16 7.63	1 6.04	14 9 12.83
24	13 57 21.57	19.05	11 59 64.0	50.3	9.568	51.93	15 47.74	16 7.90	1 6.14	14 13 9.39
25	14 1 11.59	9.05	12 20 45.0	31.3	9.599	51.47	15 54.28	16 8.16	1 6.25	14 17 5.94
26	14 4 62.34	59.77	−12 41 14.7	1.0	9.630	−50.98	−16 0.10	16 8.43	1 6.35	14 21 2.50
27	14 8 53.83	51.23	13 1 32.5	18.9	9.661	50.48	16 5.17	16 8.69	1 6.46	14 24 59.05
28	14 12 46.05	43.44	13 21 38.0	24.5	9.692	49.96	16 9.49	16 8.95	1 6.57	14 28 55.60
29	14 16 39.03	36.40	13 41 30.9	17.4	9.724	49.42	16 13.07	16 9.21	1 6.68	14 32 52.15
30	14 20 32.77	30.12	14 0 70.5	57.2	9.755	48.87	16 15.90	16 9.47	1 6.79	14 36 48.70
31	14 24 27.27	24.61	−14 20 36.6	23.4	9.787	−48.29	−16 17.97	16 9.73	1 6.90	14 40 45.26
Nov. 1	14 28 22.55	19.88	14 39 48.7	35.6	9.820	47.70	16 19.26	16 9.98	1 7.01	14 44 41.82
2	14 32 18.62	15.94	14 58 46.5	33.6	9.853	47.10	16 19.75	16 10.23	1 7.13	14 48 38.37
3	14 36 15.49	12.80	15 17 29.6	16.9	9.886	46.47	16 19.45	16 10.48	1 7.25	14 52 34.93
4	14 40 13.16	10.47	15 35 57.4	44.9	9.920	45.83	16 18.34	16 10.73	1 7.37	14 56 31.49
5	14 44 11.65	8.95	−15 53 69.7	57.4	9.954	−45.18	−16 16.42	16 10.97	1 7.49	15 0 28.04
6	14 48 10.96	8.26	16 11 66.1	54.0	9.988	44.50	16 13.67	16 11.21	1 7.61	15 4 24.59
7	14 52 11.10	8.40	16 29 46.0	34.1	10.023	43.81	16 10.09	16 11.45	1 7.73	15 8 21.14
8	14 56 12.08	9.38	16 46 69.3	57.7	10.058	43.11	16 5.67	16 11.68	1 7.85	15 12 17.70
9	15 0 13.91	11.21	17 4 15.6	4.3	10.094	42.38	16 0.41	16 11.91	1 7.97	15 16 14.26
10	15 4 16.59	13.90	−17 20 64.4	53.4	10.130	−41.65	−15 54.29	16 12.13	1 8.09	15 20 10.81
11	15 8 20.13	17.45	17 37 35.3	24.6	10.166	40.90	15 47.31	16 12.35	1 8.21	15 24 7.37
12	15 12 24.54	21.87	17 53 47.9	37.5	10.202	40.13	15 39.46	16 12.56	1 8.33	15 28 3.92
13	15 16 29.82	27.16	18 9 41.9	31.8	10.238	39.35	15 30.75	16 12.77	1 8.45	15 32 0.48
14	15 20 35.96	33.32	18 25 17.0	7.2	10.274	38.56	15 21.18	16 12.98	1 8.57	15 35 57.04
15	15 24 42.97	40.35	−18 40 32.6	23.1	10.310	−37.74	−15 10.74	16 13.19	1 8.68	15 39 53.60
16	15 28 50.83	48.24	−18 55 28.4	19.2	10.346	−36.91	−14 59.44	16 13.39	1 8.79	15 43 50.16

NOTE.—For mean time interval of semidiameter passing meridian, subtract $0^{s}.18$ from the sidereal interval.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Decli-nation.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
Nov. 16	15 28 50.83	48.24	−18 55 28.4	19.2	10.346	−36.91	−14 59.44	16 13.39	1 8.79	15 43 50.16
17	15 32 59.54	56.98	19 9 64.2	55.3	10.381	36.06	14 47.29	16 13.59	1 8.91	15 47 46.71
18	15 37 9.10	6.57	19 24 19.4	10.9	10.416	35.19	14 34.29	16 13.79	1 9.02	15 51 43.26
19	15 41 19.51	17.01	19 38 13.7	5.5	10.451	34.30	14 20.45	16 13.98	1 9.14	15 55 39.82
20	15 45 30.75	28.28	19 51 46.6	38.7	10.485	33.40	14 5.78	16 14.17	1 9.25	15 59 36.38
21	15 49 42.80	40.37	−20 4 57.8	50.3	10.519	−32.50	−13 50.30	16 14.36	1 9.36	16 3 32.93
22	15 53 55.64	53.25	20 17 46.9	39.8	10.552	31.58	13 34.01	16 14.55	1 9.47	16 7 29.49
23	15 58 9.28	6.93	20 30 13.6	6.9	10.584	30.64	13 16.93	16 14.73	1 9.58	16 11 26.05
24	16 2 23.68	21.38	20 42 17.5	11.1	10.615	29.68	12 59.09	16 14.91	1 9.69	16 15 22.61
25	16 6 38.83	36.58	20 53 58.2	52.2	10.646	28.71	12 40.49	16 15.09	1 9.79	16 19 19.16
26	16 10 54.71	52.52	−21 5 15.4	9.7	10.676	−27.72	−12 21.16	16 15.26	1 9.89	16 23 15.71
27	16 15 11.30	9.16	21 16 8.7	3.3	10.705	26.72	12 1.13	16 15.43	1 9.99	16 27 12.27
28	16 19 28.59	26.50	21 26 37.8	32.8	10.734	25.71	11 40.41	16 15.60	1 10.09	16 31 8.83
29	16 23 46.54	44.51	21 36 42.4	37.8	10.762	24.68	11 19.02	16 15.76	1 10.18	16 35 5.39
30	16 28 5.15	3.18	21 46 22.3	18.0	10.789	23.64	10 56.97	16 15.92	1 10.27	16 39 1.94
Dec. 1	16 32 24.39	22.48	−21 55 37.0	33.0	10.814	−22.59	−10 34.29	16 16.08	1 10.36	16 42 58.50
2	16 36 44.23	42.39	22 4 26.3	22.6	10.839	21.52	10 11.00	16 16.23	1 10.45	16 46 55.06
3	16 41 4.67	2.90	22 12 50.1	46.7	10.863	20.44	9 47.12	16 16.38	1 10.52	16 50 51.62
4	16 45 25.67	23.97	22 20 47.9	44.9	10.887	19.36	9 22.67	16 16.52	1 10.59	16 54 48.17
5	16 49 47.21	45.58	22 28 19.7	17.0	10.908	18.27	8 57.67	16 16.66	1 10.67	16 58 44.73
6	16 54 9.28	7.72	−22 35 25.2	22.8	10.929	−17.17	− 8 32.16	16 16.79	1 10.74	17 2 41.29
7	16 58 31.84	30.36	22 42 4.1	2.0	10.949	16.06	8 6.15	16 16.91	1 10.81	17 6 37.84
8	17 2 54.87	53.47	22 48 16.3	14.4	10.969	14.94	7 39.67	16 17.03	1 10.87	17 10 34.40
9	17 7 18.36	17.04	22 54 1.6	0.0	10.987	13.82	7 12.74	16 17.14	1 10.93	17 14 30.96
10	17 11 42.28	41.04	22 59 19.8	18.4	11.004	12.69	6 45.37	16 17.25	1 10.99	17 18 27.52
11	17 16 6.60	5.44	−23 4 10.7	9.5	11.020	−11.55	− 6 17.60	16 17.35	1 11.04	17 22 24.08
12	17 20 31.30	30.22	23 8 34.2	33.2	11.036	10.41	5 49.45	16 17.45	1 11.09	17 26 20.63
13	17 24 56.34	55.35	23 12 30.1	29.3	11.050	9.26	5 20.95	16 17.54	1 11.13	17 30 17.19
14	17 29 21.70	20.80	23 15 58.3	57.6	11.062	8.11	4 52.14	16 17.63	1 11.17	17 34 13.75
15	17 33 47.34	46.53	23 18 58.7	58.2	11.073	6.95	4 23.06	16 17.71	1 11.20	17 38 10.31
16	17 38 13.23	12.51	−23 21 31.1	30.7	11.083	− 5.77	− 3 53.72	16 17.78	1 11.22	17 42 6.87
17	17 42 39.35	38.72	23 23 35.6	35.3	11.091	4.60	3 24.15	16 17.85	1 11.24	17 46 3.43
18	17 47 5.65	5.11	23 25 12.0	11.8	11.098	3.43	2 54.39	16 17.92	1 11.26	17 49 59.98
19	17 51 32.08	31.64	23 26 20.1	20.0	11.103	2.25	2 24.50	16 17.98	1 11.28	17 53 56.54
20	17 55 58.63	58.28	23 26 59.9	59.8	11.107	− 1.07	1 54.51	16 18.04	1 11.29	17 57 53.10
21	18 0 25.25	24.99	−23 27 11.5	11.4	11.109	+ 0.11	− 1 24.44	16 18.10	1 11.30	18 1 49.66
22	18 4 51.90	51.74	23 26 54.8	54.8	11.110	1.29	0 54.33	16 18.15	1 11.30	18 5 46.21
23	18 9 18.54	18.47	23 26 9.8	9.8	11.109	2.47	− 0 24.24	16 18.20	1 11.30	18 9 42.77
24	18 13 45.13	45.15	23 24 56.5	56.5	11.106	3.65	+ 0 5.80	16 18.24	1 11.29	18 13 39.33
25	18 18 11.63	11.74	23 23 14.9	14.9	11.102	4.83	0 35.75	16 18.28	1 11.28	18 17 35.89
26	18 22 38.01	38.21	−23 21 5.0	4.9	11.096	+ 6.00	+ 1 5.58	16 18.32	1 11.26	18 21 32.45
27	18 27 4.23	4.52	23 18 27.0	26.8	11.088	7.17	1 35.25	16 18.35	1 11.24	18 25 29.01
28	18 31 30.24	30.62	23 15 20.9	20.6	11.080	8.34	2 4.73	16 18.37	1 11.21	18 29 25.56
29	18 35 56.03	56.50	23 11 46.8	46.4	11.069	9.50	2 33.96	16 18.39	1 11.18	18 33 22.12
30	18 40 21.55	22.11	23 7 44.8	44.3	11.057	10.66	3 2.93	16 18.41	1 11.15	18 37 18.68
31	18 44 46.77	47.42	−23 3 15.0	14.4	11.044	+11.82	+ 3 31.61	16 18.42	1 11.11	18 41 15.24
32	18 49 11.67	12.40	−22 58 17.6	16.8	11.030	+12.98	+ 3 59.95	16 18.43	1 11.07	18 45 11.79

Note.—For mean time interval of semidiameter passing meridian, subtract 0^{s}.19 from the sidereal interval.

AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Jan. 2	0 56.28	2.574	19 46 31.63	164.77	−21 31 12.5	+200.9	74.03	16 27.8	60 18.8	
3	1 56.41	2.427	20 50 45.72	155.84	−19 26 23.0	414.3	71.95	16 15.6	59 33.9	I. S.
4	2 52.48	2.245	21 50 55.80	144.91	−16 7 30.2	569.9	69.35	16 0.6	58 39.1	I. S.
5	3 44.23	2.072	22 46 45.63	134.47	−11 58 21.2	666.8	66.78	15 44.7	57 40.5	I. S.
6	4 32.18	1.932	23 38 47.36	126.05	− 7 20 37.0	714.7	64.65	15 29.3	56 43.8	I. S.
7	5 17.28	1.834	0 27 57.26	120.21	− 2 31 36.0	+725.1	63.12	15 15.4	55 52.9	I. S.
8	6 0.57	1.781	1 15 18.52	117.00	+ 2 15 34.8	706.8	62.26	15 3.9	55 10.5	I. S.
9	6 43.08	1.768	2 1 52.52	116.23	6 50 41.5	665.3	62.05	14 55.2	54 38.5	I. S.
10	7 25.72	1.791	2 48 34.71	117.61	11 4 59.5	602.7	62.39	14 49.3	54 17.0	I. S.
11	8 9.28	1.843	3 36 11.89	120.72	14 50 5.2	519.1	63.19	14 46.3	54 6.1	I. S.
12	8 54.33	1.914	4 25 18.89	124.98	+17 57 15.2	+413.0	64.24	14 45.9	54 4.7	I. S.
13	9 41.18	1.990	5 16 13.94	129.59	20 17 21.6	283.8	65.38	14 47.9	54 11.9	I. S.
14	10 29.78	2.056	6 8 54.26	133.59	21 41 31.3	+133.7	66.41	14 51.7	54 26.0	I. S.
15	11 19.70	2.098	7 2 54.65	136.14	22 2 27.0	− 30.9	66.96	14 57.1	54 45.7	I. N. S.
16	12 10.26	2.108	7 57 32.89	136.72	21 16 2.3	−200.9	67.09	15 3.5	55 9.2	II. N. S.
17	13 0.67	2.087	8 52 2.05	135.44	+19 22 36.7	−364.1	66.78	15 10.7	55 35.7	II. S,
18	13 50.31	2.047	9 45 45.29	133.03	16 27 8.4	−509.6	66.20	15 18.5	56 4.1	II. S.
19	14 38.92	2.005	10 38 26.77	130.48	12 38 25.6	−629.2	65.60	15 26.7	56 34.0	II. S.
20	15 26.65	1.977	11 30 15.11	128.76	8 7 52.2	−718.2	65.22	15 35.1	57 5.2	II. S.
21	16 14.01	1.975	12 21 40.62	128.69	+ 3 8 27.5	−773.1	65.26	15 43.7	57 37.2	II. S.
22	17 1.75	2.010	13 13 29.80	130.81	− 2 5 42.7	−791.3	65.86	15 52.6	58 9.7	II. S.
23	17 50.83	2.066	14 6 38.75	135.35	− 7 19 4.4	−768.2	67.05	16 1.5	58 42.2	II. S.
24	18 42.18	2.199	15 2 4.76	142.19	−12 13 58.8	−697.9	68.77	16 9.9	59 12.9	II. S.
25	19 36.57	2.336	16 0 34.00	150.41	−16 30 13.7	−573.9	70.78	16 17.1	59 39.6	II. S.
26	20 34.28	2.469	17 2 22.58	158.41	−19 45 51.7	−395.0	72.65	16 22.4	59 58.8	II. S.
27	21 34.74	2.558	18 6 56.52	163.78	−21 40 14.2	−170.3	73.85	16 24.7	60 7.4	II. S.
28	22 36.43	2.567	19 12 44.88	164.37	−21 59 28.9	+ 75.3	73.93	16 23.4	60 2.6	II. N. S.
29	23 37.30	2.491	20 17 43.67	159.74	−20 41 44.0	308.7	72.80	16 18.2	59 43.5	
31	0 35.51	2.353	21 20 2.16	151.36	−17 58 16.7	499.9	70.79	16 9.3	59 10.9	
Feb. 1	1 30.04	2.192	22 18 39.42	141.68	−14 9 22.9	634.8	68.43	15 57.6	58 28.0	I. S.
2	2 20.79	2.043	23 13 29.48	132.70	− 9 38 3.1	+713.1	66.20	15 44.2	57 38.8	I. S.
3	3 8.31	1.924	0 5 5.12	125.63	− 4 45 20.5	743.1	64.41	15 30.4	56 48.1	I. S.
4	3 53.46	1.845	0 54 18.18	120.87	+ 0 11 37.9	736.0	63.21	15 17.4	56 0.3	I. S.
5	4 37.20	1.806	1 42 6.10	118.51	4 59 36.9	699.6	62.63	15 6.2	55 18.9	I. S.
6	5 20.45	1.803	2 29 24.55	118.38	9 28 11.5	639.7	62.63	14 57.3	54 46.2	I. S.
7	6 4.03	1.833	3 17 3.41	120.16	+13 28 34.9	+558.8	63.13	14 51.2	54 23.9	I. S.
8	6 48.64	1.888	4 5 43.79	123.41	16 52 34.7	457.7	63.99	14 48.2	54 12.8	I. S.
9	7 34.75	1.956	4 55 54.22	127.53	19 31 57.7	335.7	65.05	14 48.1	54 12.7	I. S.
10	8 22.54	2.026	5 47 46.32	131.75	21 18 27.8	193.4	66.09	14 50.9	54 22.9	I. N. S.
11	9 11.89	2.082	6 41 11.50	135.15	22 4 27.6	+ 34.1	66.88	14 56.1	54 42.1	I. N.
12	10 2.30	2.114	7 35 41.55	137.05	+21 44 14.5	−136.0	67.30	15 3.3	55 8.6	I. N.
13	10 53.13	2.116	8 30 35.88	137.18	20 15 29.6	−306.7	67.27	15 11.9	55 40.1	I. N.
14	11 43.68	2.093	9 25 14.08	135.81	17 40 22.7	−466.1	66.88	15 21.2	56 14.3	I. N.
15	12 33.51	2.058	10 19 8.65	133.69	14 5 42.6	−603.0	66.34	15 30.6	56 48.8	II. N. S.
16	13 22.51	2.096	11 12 12.83	131.76	+ 9 42 19.1	−708.5	65.87	15 39.5	57 21.5	II. S.

AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Feb. 16	13 22.51	2.026	11 12 12.83	131.76	+ 9 42 19.1	−706.5	65.87	15 39.5	57 21.5	II. S.
17	14 10.91	2.012	12 4 41.84	130.87	+ 4 43 59.1	−776.5	65.69	15 47.6	57 51.0	II. S.
18	14 59.29	2.025	12 57 8.96	131.68	− 0 33 32.2	−803.7	65.96	15 54.5	58 16.4	II. S.
19	15 48.39	2.072	13 50 19.40	134.52	− 5 53 7.9	−786.6	66.75	16 0.2	58 37.5	II. S.
20	16 39.02	2.153	14 45 2.39	139.36	−10 56 33.5	−722.5	68.05	16 4.8	58 54.3	II. S.
21	17 31.91	2.258	15 42 1.07	145.70	−15 24 34.6	−609.3	69.67	16 8.2	59 7.0	II. S.
22	18 27.45	2.369	16 41 38.76	152.38	−18 57 32.4	−447.6	71.30	16 10.5	59 15.2	II. S.
23	19 25.42	2.455	17 43 43.21	157.60	−21 17 8.0	−244.1	72.54	16 11.4	59 18.4	II. n. S.
24	20 24.89	2.488	18 47 17.85	159.61	−22 9 36.9	− 15.6	72.96	16 10.6	59 15.7	II. N.
25	21 24.34	2.453	19 50 51.24	157.46	−21 29 40.4	+213.6	72.38	16 8.7	59 5.9	II. N.
26	22 22.17	2.357	20 52 46.82	151.67	−19 22 26.1	+416.9	70.92	16 3.1	58 47.9	II. N.
27	23 17.22	2.228	21 51 55.57	143.89	−16 2 10.1	576.0	68.97	15 56.1	58 22.2	
Mar. 1	0 9.07	2.095	22 47 51.61	135.88	−11 48 23.3	684.0	66.93	15 47.0	57 49.0	
2	0 57.92	1.981	23 40 47.13	129.00	− 7 1 40.7	741.7	65.17	15 36.7	57 11.0	I. N. S.
3	1 44.37	1.896	0 31 18.31	123.93	− 2 0 54.3	755.6	63.88	15 25.6	56 30.5	I. S.
4	2 29.20	1.846	1 20 12.14	120.89	+ 2 57 58.2	+733.4	63.12	15 14.9	55 51.0	I. S.
5	3 13.23	1.829	2 8 17.64	119.88	7 41 53.3	681.8	62.92	15 5.1	55 15.1	I. S.
6	3 57.22	1.842	2 56 20.67	120.65	12 0 6.3	605.5	63.20	14 57.2	54 46.0	I. S.
7	4 41.82	1.879	3 45 0.68	122.90	15 43 25.5	507.7	63.86	14 51.6	54 25.5	I. S.
8	5 27.53	1.932	4 34 47.41	126.12	18 43 32.3	389.5	64.75	14 48.8	54 15.2	I. S.
9	6 14.63	1.992	5 25 57.59	129.72	+20 52 39.9	+253.0	65.71	14 49.0	54 16.0	I. S.
10	7 3.13	2.047	6 18 32.10	133.03	22 3 42.7	+ 99.9	66.55	14 52.2	54 27.8	I. N.
11	7 52.77	2.086	7 12 15.34	135.37	22 10 52.3	− 65.5	67.10	14 58.4	54 50.4	I. N.
12	8 43.09	2.103	8 6 39.26	136.39	21 10 36.7	−236.0	67.30	15 7.0	55 22.2	I. N.
13	9 33.55	2.098	9 1 11.66	136.11	19 2 40.4	−402.5	67.13	15 17.6	56 1.2	I. N.
14	10 23.72	2.081	9 55 26.65	135.03	+15 50 45.1	−554.3	66.83	15 29.5	56 44.5	I. N.
15	11 13.42	2.062	10 49 13.09	133.88	11 42 42.3	−681.0	66.48	15 41.5	57 28.6	I. N.
16	12 2.76	2.053	11 42 38.36	133.40	6 50 20.3	−774.1	66.34	15 52.7	58 9.9	II. N.
17	12 52.16	2.067	12 36 6.93	134.24	+ 1 28 59.7	−824.9	66.56	16 2.2	58 44.9	II. N. S.
18	13 42.22	2.110	13 30 15.78	136.79	− 4 3 3.1	−826.7	67.25	16 9.5	59 11.5	II. S.
19	14 33.66	2.182	14 25 46.94	141.08	− 9 25 16.1	−775.0	68.39	16 13.9	59 27.8	II. S.
20	15 27.08	2.273	15 23 17.48	146.62	−14 15 51.5	−668.6	69.86	16 15.6	59 34.1	II. S.
21	16 22.80	2.369	16 23 6.39	152.38	−18 13 12.7	−509.9	71.32	16 14.9	59 31.3	II. S.
22	17 20.61	2.442	17 25 0.26	156.78	−20 58 8.5	−308.6	72.42	16 12.1	59 21.1	II. S.
23	18 19.63	2.467	18 28 8.65	158.96	−22 16 56.8	− 62.8	72.79	16 7.8	59 5.4	II. N. s.
24	19 18.52	2.430	19 31 7.82	156.04	−22 4 10.4	+144.6	72.23	16 2.5	58 45.7	II. N.
25	20 15.82	2.338	20 32 32.03	150.54	−20 23 56.8	350.8	70.85	15 56.2	58 22.6	II. N.
26	21 10.51	2.217	21 31 19.06	143.22	−17 28 25.3	519.3	68.98	15 49.2	57 57.0	II. N.
27	22 2.19	2.092	22 27 4.73	135.67	−13 34 31.7	642.2	67.01	15 41.6	57 29.1	II. N.
28	22 51.02	1.983	23 19 59.40	129.12	− 9 0 42.4	719.4	65.27	15 33.5	56 59.2	II. N.
29	23 37.55	1.901	0 10 35.92	124.24	− 4 4 43.0	+754.0	63.95	15 24.9	56 27.8	
31	0 22.53	1.852	0 59 37.78	121.25	+ 0 57 23.5	750.8	63.15	15 16.2	55 55.9	
32	1 6.68	1.833	1 47 50.64	120.13	5 51 28.5	714.6	62.88	15 7.9	55 25.4	I. n. S.
33	1 50.73	1.842	2 35 57.36	120.69	10 25 12.1	649.5	63.07	15 0.4	54 57.6	I. S.
34	2 35.28	1.874	3 24 34.40	122.59	+14 27 44.1	+559.0	63.65	14 54.1	54 34.8	I. S.

AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Apr. 1	1 6.68	1.833	1 47 50.64	120.13	+ 5 51 28.5	+714.6	62.88	15 7.9	55 25.4	I. S.
2	1 50.73	1.849	2 35 57.36	120.69	10 25 12.1	649.5	63.07	15 0.4	54 57.6	I. S.
3	2 35.28	1.874	3 24 34.40	122.59	14 27 44.1	559.0	63.65	14 54.1	54 34.8	I. S.
4	3 20.79	1.920	4 14 8.85	125.39	17 49 28.1	445.9	64.47	14 49.7	54 18.4	I. S.
5	4 7.50	1.972	5 4 55.67	128.51	20 21 55.3	313.2	65.37	14 47.6	54 10.7	I. S.
6	4 55.42	2.020	5 56 55.62	131.38	+21 57 50.7	+164.2	66.17	14 48.2	54 12.8	I. N. S.
7	5 44.34	2.054	6 49 55.34	133.44	22 31 35.2	+ 3.1	66.74	14 51.7	54 25.5	I. N.
8	6 33.86	2.060	7 43 31.22	134.37	21 59 37.3	−163.6	66.98	14 58.1	54 49.2	I. N.
9	7 23.54	2.067	8 37 16.50	134.25	20 21 2.4	−328.8	66.92	15 7.3	55 23.3	I. N.
10	8 13.02	2.055	9 30 50.30	133.50	17 37 52.5	−485.0	66.68	15 19.1	56 6.5	I. N.
11	9 2.18	2.043	10 24 4.68	132.76	+13 55 16.1	−694.5	66.42	15 32.7	56 56.5	I. N.
12	9 51.17	2.043	11 17 8.46	132.73	9 21 36.4	−738.8	66.35	15 47.2	57 49.5	I. N.
13	10 40.40	2.065	12 10 26.64	134.05	+ 4 8 48.7	−818.6	66.64	16 1.2	58 41.1	I. N.
14	11 30.49	2.116	13 4 37.05	137.14	− 1 27 15.3	−853.4	67.40	16 13.6	59 26.7	I. N.
15	12 22.19	2.198	14 0 24.12	142.09	− 7 6 37.6	−833.5	68.65	16 23.0	60 1.2	II. N.
16	13 16.18	2.305	14 58 28.89	148.48	−12 25 40.6	−751.1	70.27	16 28.5	60 21.4	II. N.
17	14 12.86	2.418	15 59 14.61	155.24	−16 58 49.4	−604.5	71.96	16 29.7	60 25.7	II. N.
18	15 11.98	2.504	17 2 28.95	160.54	−20 21 44.6	−402.5	73.29	16 26.7	60 14.8	II. N.
19	16 12.61	2.534	18 7 13.38	162.46	−22 16 0.1	−165.6	73.81	16 20.4	59 51.6	II. N.
20	17 13.14	2.494	19 11 51.24	159.96	−22 33 21.5	+ 76.9	73.26	16 11.7	59 19.7	II. N.
21	18 11.84	2.389	20 14 39.68	153.56	−21 17 22.3	+297.3	71.74	16 1.7	58 43.0	II. N.
22	19 7.51	2.248	21 14 25.49	145.08	−18 41 3.8	476.6	69.64	15 51.3	58 4.7	II. N.
23	19 59.70	2.104	22 10 41.91	136.40	−15 2 22.3	609.0	67.42	15 41.0	57 26.9	II. N.
24	20 48.64	1.980	23 3 43.02	128.97	−10 40 0.3	695.7	65.44	15 31.3	56 51.1	II. N.
25	21 34.98	1.888	23 54 7.94	123.46	− 5 51 14.5	741.7	63.92	15 22.2	56 17.8	II. N.
26	22 19.56	1.833	0 42 46.38	120.11	− 0 51 20.2	+752.1	62.96	15 13.9	55 47.3	II. N.
27	23 3.22	1.811	1 30 29.48	118.62	+ 4 6 12.9	730.5	62.57	15 6.3	55 19.5	II. N.
28	23 46.73	1.820	2 18 4.28	119.37	8 49 12.2	679.7	62.70	14 59.6	54 55.0	
30	0 30.77	1.853	3 6 10.40	121.36	13 6 17.9	601.3	63.25	14 54.0	54 34.2	
May 1	1 15.81	1.902	3 55 17.00	124.30	16 46 55.3	497.8	64.07	14 49.5	54 17.6	I. N.
2	2 2.12	1.957	4 45 39.64	127.57	+19 41 22.4	+371.1	65.00	14 46.5	54 6.8	I. N.
3	2 49.69	2.005	5 37 17.92	130.50	21 41 16.9	225.6	65.83	14 45.5	54 3.0	I. N.
4	3 38.24	2.037	6 29 55.56	132.44	22 40 12.8	+ 67.2	66.41	14 46.5	54 6.9	I. N.
5	4 27.32	2.048	7 23 4.80	133.11	22 34 18.6	− 97.3	66.64	14 50.2	54 20.2	I. N.
6	5 16.41	2.039	8 16 14.76	132.55	21 22 37.3	−260.2	66.54	14 56.5	54 43.4	I. N.
7	6 5.11	2.018	9 9 1.31	131.26	+19 7 5.5	−415.3	66.23	15 5.6	55 16.9	I. N.
8	6 53.26	1.996	10 1 15.01	129.94	15 52 10.3	−556.4	65.87	15 17.3	56 0.0	I. N.
9	7 41.02	1.987	10 53 4.87	129.40	11 44 30.2	−678.3	65.69	15 31.4	56 51.5	I. N.
10	8 28.83	2.002	11 44 57.84	130.31	6 52 58.9	−774.6	65.88	15 46.9	57 48.6	I. N.
11	9 17.39	2.051	12 37 36.08	133.24	+ 1 29 21.4	−837.0	66.59	16 2.8	58 47.1	I. N.
12	10 7.57	2.138	13 31 51.85	138.47	− 4 10 44.4	−854.8	67.87	16 17.8	59 42.0	I. N.
13	11 0.29	2.261	14 28 39.98	145.86	− 9 46 48.0	−814.8	69.70	16 30.0	60 26.9	I. N.
14	11 56.26	2.406	15 28 44.23	154.59	−14 53 24.7	−705.9	71.81	16 38.1	60 56.7	I. N.
15	12 55.69	2.542	16 32 16.41	162.81	−19 1 58.6	−595.8	73.79	16 41.1	61 7.5	II. N. S.
16	13 57.86	2.625	17 38 33.32	167.86	−21 46 19.1	−398.4	75.01	16 38.5	60 57.9	II. N. S.

AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
May 16	13 57.86	2.695	17 38 33.32	167.86	−21 46 19.1	−288.4	75.01	16 38.5	60 57.9	II. N. S.
17	15 1.04	2.620	18 45 50.56	167.58	−22 49 13.3	− 25.4	75.01	16 31.1	60 30.7	II. N.
18	16 2.95	2.523	19 51 52.00	161.71	−22 8 10.9	+224.8	73.69	16 19.9	59 49.9	II. N.
19	17 1.69	2.365	20 54 43.02	152.19	−19 55 0.4	432.1	71.44	16 6.7	59 1.4	II. N.
20	17 56.34	2.190	21 53 27.53	141.60	−16 29 58.6	583.7	68.85	15 52.8	58 10.3	II. N.
21	18 46.95	2.033	22 48 8.55	132.12	−12 15 7.1	+682.2	66.43	15 39.3	57 20.6	II. N.
22	19 34.19	1.911	23 39 27.28	124.84	− 7 30 8.0	735.9	64.48	15 26.9	56 35.0	II. N.
23	20 19.02	1.832	0 28 21.44	120.10	− 2 31 17.5	752.7	63.16	15 15.9	55 54.8	II. N.
24	21 2.47	1.794	1 15 51.66	117.81	+ 2 28 2.2	739.1	62.48	15 6.7	55 20.9	II. N.
25	21 45.45	1.793	2 2 54.34	117.74	7 16 18.8	697.9	62.40	14 59.1	54 53.0	II. N.
26	22 28.78	1.822	2 50 17.96	119.48	+11 42 54.3	+630.8	62.82	14 53.1	54 31.0	II. N.
27	23 13.09	1.873	3 38 40.01	122.51	15 37 31.2	538.3	63.61	14 48.6	54 14.6	II. N.
28	23 58.75	1.933	4 28 23.61	126.15	18 50 7.3	421.0	64.56	14 45.6	54 3.3	
30	0 45.84	1.990	5 19 33.89	129.59	21 11 22.5	282.1	65.48	14 44.0	53 57.6	
31	1 34.15	2.031	6 11 56.56	132.06	22 33 32.1	+196.5	66.16	14 44.1	53 58.0	I. N. S.
June 1	2 23.14	2.047	7 5 0.71	133.00	+22 51 28.2	− 37.9	66.46	14 46.0	54 4.8	I. N.
2	3 12.18	2.036	7 58 7.64	132.33	22 3 27.0	−201.6	66.35	14 49.8	54 19.0	I. N.
3	4 0.69	2.004	8 50 42.92	130.47	20 11 15.7	−357.2	65.94	14 55.9	54 41.3	I. N.
4	4 48.35	1.967	9 42 27.14	128.21	17 19 37.9	−498.1	65.42	15 4.4	55 12.3	I. N.
5	5 35.19	1.938	10 33 21.60	126.47	13 35 20.4	−619.9	64.97	15 15.2	55 52.2	I. N.
6	6 21.57	1.932	11 23 48.54	126.09	+ 9 6 39.4	−719.5	64.87	15 28.3	56 40.3	I. N.
7	7 8.16	1.958	12 14 28.30	127.64	+ 4 3 17.7	−792.5	65.27	15 43.2	57 35.0	I. N.
8	7 55.87	2.026	13 6 15.17	131.71	− 1 22 51.5	−831.9	66.30	15 59.1	58 33.4	I. N.
9	8 45.74	2.138	14 0 12.17	138.48	− 6 56 24.9	−827.3	67.99	16 14.8	59 31.2	I. N.
10	9 38.82	2.292	14 57 22.17	147.69	−12 17 3.7	−765.1	70.23	16 28.8	60 22.6	I. N.
11	10 35.88	2.463	15 58 31.34	158.12	−16 59 5.0	−632.5	72.72	16 39.3	61 1.2	I. N.
12	11 36.95	2.617	17 3 42.43	167.35	−20 33 24.9	−427.5	74.87	16 45.0	61 21.8	I. N.
13	12 40.93	2.696	18 11 48.08	172.13	−22 33 44.8	−167.5	76.00	16 44.7	61 20.9	II. N.
14	13 45.53	2.665	19 20 31.22	170.30	−22 45 20.9	+108.3	75.60	16 38.6	60 58.4	II. N.
15	14 48.11	2.534	20 27 12.84	162.34	−21 10 55.4	356.1	73.80	16 27.7	60 18.3	II. N.
16	15 46.75	2.349	21 29 57.76	151.13	−18 8 29.0	+545.6	71.16	16 13.5	59 26.4	II. N.
17	16 40.80	2.159	22 28 5.95	139.79	−14 3 6.6	670.9	68.38	15 57.8	58 28.6	II. N.
18	17 30.62	2.000	23 21 59.91	130.17	− 9 19 17.4	739.8	65.94	15 42.1	57 30.8	II. N.
19	18 17.14	1.885	0 12 35.54	123.27	− 4 17 13.4	764.1	64.13	15 27.5	56 37.3	II. N.
20	19 1.48	1.817	1 0 59.52	119.19	+ 0 47 29.3	754.4	63.00	15 14.7	55 50.4	II. N.
21	19 44.71	1.792	1 48 17.07	117.68	+ 5 42 38.8	+717.1	62.56	15 4.2	55 11.7	II. N.
22	20 27.80	1.805	2 35 26.30	118.42	10 17 58.2	655.5	62.71	14 56.0	54 41.5	II. N.
23	21 11.55	1.846	3 23 15.07	120.88	14 23 59.0	570.7	63.31	14 50.0	54 19.5	II. N.
24	21 56.53	1.905	4 12 17.67	124.45	17 51 18.8	462.2	64.21	14 46.1	54 5.2	II. N.
25	22 43.01	1.969	5 2 50.81	128.28	20 30 43.0	331.2	65.17	14 44.1	53 57.9	II. N.
26	23 30.93	2.021	5 54 50.14	131.49	+22 13 43.2	+180.9	65.97	14 43.8	53 56.8	
28	0 19.85	2.050	6 47 50.22	133.23	22 53 48.7	+ 18.2	66.42	14 45.1	54 1.7	
29	1 9.11	2.049	7 41 10.64	133.16	22 27 40.2	−148.3	66.42	14 47.9	54 12.1	I. N.
30	1 58.00	2.030	8 34 8.20	131.40	20 55 54.5	−308.4	66.02	14 52.4	54 28.3	I. N.
31	2 45.96	1.975	9 26 10.42	128.70	+18 22 54.1	−453.4	65.37	14 58.4	54 50.5	I. N.

AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
July 1	2 45.96	1.975	9 26 10.42	128.70	+18 22 54.1	−453.4	65.37	14 58.4	54 50.5	I. N.
2	3 32.80	1.930	10 17 5.05	125.93	14 55 52.1	−578.0	64.71	15 6.1	55 18.9	I. N.
3	4 18.70	1.899	11 7 2.82	124.11	10 43 45.3	−678.4	64.27	15 15.7	55 54.0	I. N.
4	5 4.17	1.896	11 56 35.26	123.93	5 56 32.0	−753.0	64.27	15 27.0	56 35.5	I. N.
5	5 50.02	1.932	12 46 30.49	126.06	+ 0 45 10.7	−798.4	64.86	15 39.9	57 23.0	I. N.
6	6 37.25	2.012	13 37 48.62	130.91	− 4 37 34.9	−808.9	66.12	15 54.0	58 14.6	I. N.
7	7 26.97	2.139	14 31 36.31	138.53	− 9 56 2.2	−775.0	68.06	16 8.3	59 7.3	I. N.
8	8 20.22	2.305	15 28 56.74	148.47	−14 50 7.4	−685.2	70.50	16 21.8	59 56.7	I. N.
9	9 17.69	2.485	16 30 31.01	159.33	−18 55 4.2	−528.2	73.07	16 32.9	60 37.6	I. N.
10	10 19.22	2.633	17 36 9.56	168.30	−21 43 43.9	−305.3	75.13	16 40.2	61 4.2	I. N.
11	11 23.42	2.696	18 44 28.20	172.16	−22 53 1.4	− 36.7	76.00	16 42.3	61 12.2	I. N.
12	12 27.80	2.647	19 52 58.42	169.19	−22 12 38.3	+235.6	75.31	16 38.9	60 59.4	II. N.
13	13 29.78	2.505	20 59 4.01	160.53	−19 49 53.6	468.8	73.30	16 30.1	60 27.1	II. N.
14	14 27.68	2.318	22 1 3.86	149.28	−16 6 19.0	637.7	70.62	16 17.3	59 40.1	II. N.
15	15 21.07	2.137	22 58 32.98	138.38	−11 28 58.9	738.3	67.96	16 2.0	58 44.1	II. N.
16	16 10.50	1.990	23 52 3.16	129.56	− 6 23 10.0	+782.0	65.74	15 45.9	57 45.0	II. N.
17	16 56.94	1.889	0 42 33.95	123.48	− 1 3 11.2	781.5	64.17	15 30.5	56 48.2	II. N.
18	17 41.52	1.833	1 31 12.20	120.17	+ 3 57 38.6	747.7	63.29	15 16.7	55 57.8	II. N.
19	18 25.27	1.819	2 19 1.42	119.34	8 45 36.6	688.0	63.01	15 5.1	55 15.0	II. N.
20	19 9.13	1.841	3 6 56.91	120.60	13 5 5.0	605.7	63.39	14 56.1	54 42.1	II. N.
21	19 53.82	1.887	3 55 42.22	123.38	+16 47 18.3	+501.8	64.09	14 49.9	54 19.3	II. N.
22	20 39.81	1.947	4 45 45.68	126.97	19 43 45.0	376.9	64.98	14 46.3	54 5.9	II. N.
23	21 27.25	2.005	5 37 16.21	130.48	21 46 13.8	232.4	65.84	14 45.0	54 1.4	II. N.
24	22 15.92	2.046	6 30 0.89	133.00	22 47 39.6	+ 72.7	66.43	14 45.9	54 4.6	II. N . S.
25	23 5.28	2.061	7 23 27.40	133.88	22 43 18.8	− 94.9	66.61	14 48.6	54 14.4	II. N . S.
26	23 54.63	2.046	8 16 52.81	132.95	+21 31 59.6	−260.4	66.34	14 52.8	54 29.8	
28	0 43.29	2.006	9 9 37.18	130.57	19 16 34.8	−414.0	65.73	14 58.2	54 49.7	
29	1 30.86	1.957	10 1 15.62	127.60	16 3 38.4	−547.0	64.99	15 4.7	55 13.8	I. N.
30	2 17.28	1.914	10 51 45.01	124.99	12 2 25.7	−654.5	64.35	15 12.3	55 41.6	I. N.
31	3 2.87	1.890	11 41 24.22	123.56	7 23 48.7	−733.6	64.03	15 20.8	56 12.9	I. N.
Aug. 1	3 48.24	1.897	12 30 50.52	124.00	+ 2 19 39.0	−782.2	64.21	15 30.3	56 47.6	I. N.
2	4 34.24	1.944	13 20 55.08	126.80	− 2 57 15.4	−796.6	65.00	15 40.6	57 25.5	I. N.
3	5 21.89	2.034	14 12 37.85	132.19	− 8 12 33.1	−772.2	66.45	15 51.6	58 5.9	I. N.
4	6 12.19	2.165	15 7 1.06	140.10	−13 9 23.4	−703.0	68.48	16 2.8	58 47.1	I. N.
5	7 6.04	2.396	16 4 57.36	149.76	−17 27 39.0	−578.7	70.86	16 13.5	59 26.3	I. N.
6	8 3.82	2.486	17 6 50.04	159.41	−20 44 19.1	−394.8	73.15	16 22.7	60 0.2	I. N.
7	9 5.01	2.601	18 12 8.50	166.42	−22 36 30.6	−158.8	74.75	16 29.4	60 24.6	I. N. S.
8	10 8.03	2.633	19 19 16.26	168.20	−22 47 36.5	+104.9	75.11	16 32.3	60 35.3	I. S.
9	11 10.55	2.563	20 25 54.30	164.04	−21 13 59.1	358.1	74.08	16 30.7	60 29.6	I. S.
10	12 10.46	2.422	21 29 55.25	155.55	−18 7 17.8	565.4	72.05	16 24.6	60 7.2	II. S.
11	13 6.58	2.255	22 30 8.23	145.53	−13 50 13.9	+708.5	69.61	16 14.5	59 29.9	II. N.
12	13 58.79	2.101	23 26 25.78	136.23	− 8 49 11.2	786.4	67.32	16 1.5	58 42.2	II. N.
13	14 47.68	1.981	0 19 23.95	129.03	− 3 28 31.5	808.7	65.51	15 46.9	57 48.7	II. N.
14	15 34.19	1.902	1 9 58.82	124.31	+ 1 51 55.7	787.3	64.33	15 32.3	56 54.8	II. N.
15	16 19.32	1.865	1 59 10.69	122.06	+ 6 56 55.2	+732.7	63.78	15 18.6	56 4.6	II. N.

AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Aug. 16	17 4.00	1.864	2 47 55.58	121.99	+11 34 43.1	+652.2	63.80	15 6.9	55 21.6	II. N.
17	17 49.02	1.891	3 37 0.57	123.67	15 35 46.6	549.6	64.27	14 57.7	54 47.8	II. N.
18	18 34.95	1.938	4 27 0.24	126.46	18 51 43.1	426.8	65.00	14 51.3	54 24.5	II. N.
19	19 22.09	1.990	5 18 12.85	129.60	21 14 51.9	285.9	65.79	14 47.9	54 11.8	II. N.
20	20 10.42	2.035	6 10 37.52	132.30	22 38 24.2	+129.6	66.44	14 47.3	54 9.5	II. N.
21	20 59.62	2.062	7 3 54.15	133.83	+22 57 8.0	− 37.0	66.77	14 49.2	54 16.6	II. S.
22	21 49.12	2.059	7 57 28.67	133.77	22 8 31.3	−205.6	66.68	14 53.3	54 31.7	II. S.
23	22 38.29	2.034	8 50 43.41	132.94	20 13 33.0	−367.4	66.23	14 59.2	54 53.3	II. S.
24	23 26.64	1.994	9 43 8.93	129.79	17 16 58.3	−512.4	65.56	15 6.3	55 19.5	
26	0 13.97	1.951	10 34 32.87	127.25	13 26 53.8	−633.6	64.88	15 14.2	55 48.6	
27	1 0.40	1.921	11 25 3.03	125.45	+ 8 54 2.1	−725.4	64.42	15 22.5	56 19.2	I. N.
28	1 46.38	1.915	12 15 5.78	125.07	+ 3 50 56.6	−784.2	64.37	15 30.9	56 50.2	I. N.
29	2 32.58	1.941	13 5 22.07	126.64	− 1 28 24.9	−806.2	64.84	15 39.2	57 20.4	I. N.
30	3 19.84	2.005	13 56 42.52	130.44	− 6 48 44.4	−788.3	65.91	15 47.3	57 50.1	I. N.
31	4 9.09	2.105	14 50 1.52	136.49	−11 53 8.4	−725.8	67.52	15 55.0	58 18.2	I. N.
Sept. 1	5 1.11	2.235	15 46 8.04	144.27	−16 22 50.7	−614.1	69.53	16 2.2	58 44.6	I. N.
2	5 56.41	2.373	16 45 31.53	152.63	−19 57 29.3	−450.6	71.61	16 8.6	59 8.3	I. N.
3	6 54.84	2.480	17 48 3.37	159.60	−22 16 47.0	−238.9	73.28	16 13.9	59 27.7	I. N.
4	7 55.40	2.545	18 52 43.61	163.00	−23 4 18.5	+ 4.6	74.04	16 17.5	59 40.9	I. S.
5	8 56.36	2.521	19 57 48.65	161.59	−22 12 26.0	252.6	73.64	16 18.8	59 45.6	I. S.
6	9 55.88	2.428	21 1 25.66	155.92	−19 45 36.7	+474.5	72.22	16 17.2	59 39.9	I. S.
7	10 52.58	2.294	22 2 13.26	147.86	−15 59 25.8	646.8	70.21	16 12.4	59 22.3	I. S.
8	11 45.95	2.156	22 59 41.07	139.57	−11 16 10.3	759.5	68.12	16 4.7	58 53.9	I. S.
9	12 36.24	2.040	23 54 3.25	132.57	− 5 59 41.5	813.8	66.33	15 54.5	58 16.3	II. N. S.
10	13 24.12	1.957	0 46 0.50	127.56	− 0 31 57.4	817.8	65.06	15 42.5	57 32.5	II. N.
11	14 10.45	1.910	1 36 23.97	124.74	+ 4 48 29.9	+779.0	64.37	15 30.0	56 46.4	II. N.
12	14 56.06	1.896	2 26 4.68	123.96	9 46 40.6	707.1	64.23	15 17.9	56 2.0	II. N.
13	15 41.70	1.911	3 15 47.32	124.83	14 10 33.4	608.2	64.53	15 7.1	55 22.4	II. N.
14	16 27.95	1.946	4 6 6.23	126.88	17 50 17.9	487.0	65.13	14 58.4	54 50.4	II. N.
15	17 15.13	1.988	4 57 21.75	129.44	20 37 41.9	347.2	65.84	14 52.3	54 28.0	II. N.
16	18 3.33	2.027	5 49 37.84	131.80	+22 25 58.1	+192.2	66.47	14 49.1	54 16.3	II. N.
17	18 52.32	2.052	6 42 41.58	133.31	23 10 0.5	+ 26.9	66.84	14 48.9	54 15.7	II. S.
18	19 41.66	2.056	7 36 7.13	133.58	22 46 56.3	−142.3	66.87	14 51.7	54 25.8	II. S.
19	20 30.86	2.040	8 29 23.50	132.58	21 16 40.4	−307.8	66.54	14 57.1	54 45.8	II. S.
20	21 19.46	2.009	9 22 4.41	130.72	18 42 13.5	−461.8	66.00	15 4.8	55 13.8	II. S.
21	22 7.26	1.975	10 13 56.70	128.67	+15 9 39.7	−597.2	65.39	15 14.0	55 47.8	II. S.
22	22 54.32	1.949	11 5 4.31	127.12	10 47 52.2	−707.0	64.93	15 24.2	56 25.1	II. S.
23	23 40.98	1.944	11 55 48.25	126.79	5 48 16.6	−785.2	64.82	15 34.5	57 2.9	
25	0 27.83	1.966	12 46 43.65	128.14	+ 0 24 42.6	−825.9	65.19	15 44.3	57 38.9	
26	1 15.62	2.022	13 38 35.31	131.50	− 5 6 40.1	−823.3	66.10	15 52.8	58 10.1	I. N.
27	2 5.15	2.111	14 32 11.89	136.85	−10 27 26.5	−772.0	67.53	15 59.7	58 35.7	I. N.
28	2 57.15	2.226	15 28 17.16	143.78	−15 17 13.9	−667.9	69.35	16 4.9	58 54.7	I. N.
29	3 52.06	2.349	16 27 17.17	151.18	−19 14 38.0	−510.4	71.25	16 8.4	59 7.3	I. N.
30	4 49.74	2.451	17 29 4.19	157.37	−21 59 12.3	−305.6	72.80	16 10.2	59 14.0	I. N.
31	5 49.33	2.502	18 32 45.60	160.43	−23 14 50.2	− 69.2	73.55	16 10.5	59 15.2	I. S.

AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Oct. 1	5 49.33	2.502	18 32 45.60	160.43	−23 14 50.2	− 69.2	73.55	16 10.5	59 15.2	I. S.
2	6 49.30	2.482	19 36 50.46	159.24	−22 53 38.3	+174.0	73.25	16 9.4	59 11.3	I. S.
3	7 47.99	2.399	20 39 38.10	154.18	−20 58 18.3	398.4	71.99	16 7.0	59 2.3	I. S.
4	8 44.15	2.278	21 39 53.30	146.87	−17 41 14.8	582.0	70.14	16 3.1	58 48.0	I. S.
5	9 37.26	2.150	22 37 5.11	139.19	−13 21 6.8	711.9	68.15	15 57.7	58 28.1	I. S.
6	10 27.49	2.040	23 31 23.49	132.59	− 8 18 52.5	+790.8	66.41	15 50.7	58 2.4	I. S.
7	11 15.43	1.961	0 23 24.55	127.83	− 2 55 5.0	820.4	65.13	15 42.3	57 31.7	I. S.
8	12 1.88	1.916	1 13 55.93	125.13	+ 2 31 29.4	805.7	64.42	15 32.9	56 57.3	II. S.
9	12 47.65	1.904	2 3 46.29	124.38	7 44 19.6	752.6	64.24	15 22.9	56 20.5	II. N. S.
10	13 33.46	1.918	2 53 38.83	125.94	12 29 9.4	666.9	64.52	15 13.1	55 44.7	II. N.
11	14 19.86	1.951	3 44 6.63	127.21	+16 33 49.1	+558.7	65.10	15 4.1	55 11.5	II. N.
12	15 7.15	1.991	4 35 28.83	129.66	19 48 9.5	415.8	65.82	14 56.7	54 44.2	II. N.
13	15 55.41	2.026	5 27 48.21	131.86	22 4 6.1	261.5	66.47	14 51.4	54 24.7	II. N.
14	16 44.37	2.050	6 20 51.01	133.19	23 15 53.8	+ 96.1	06.87	14 48.6	54 14.6	II. N. S.
15	17 33.63	2.051	7 14 11.18	133.26	23 20 27.1	− 73.5	66.92	14 48.8	54 15.3	II. S.
16	18 22.67	2.032	8 7 18.29	132.15	+22 17 30.6	−240.2	66.63	14 52.0	54 27.0	II. S.
17	19 11.08	2.001	8 59 47.32	130.21	20 9 33.4	−397.5	66.09	14 58.2	54 49.7	II. S.
18	19 58.66	1.966	9 51 26.52	128.11	17 1 28.4	−540.0	65.49	15 7.1	55 22.4	II. S.
19	20 45.50	1.940	10 42 21.17	126.60	13 0 14.0	−662.5	65.03	15 18.2	56 3.0	II. S.
20	21 31.97	1.936	11 32 53.36	126.34	8 14 49.3	−759.9	64.89	15 30.7	56 49.1	II. S.
21	22 18.67	1.960	12 23 39.54	127.83	+ 2 56 36.0	−825.2	65.24	15 43.7	57 37.0	II. S.
22	23 6.37	2.021	13 15 26.42	131.42	− 2 40 5.8	−850.7	66.14	15 56.1	58 22.5	II. S.
23	23 55.95	2.117	14 9 5.81	137.21	− 8 17 22.1	−826.6	67.62	16 6.8	59 1.8	
25	0 48.20	2.242	15 5 25.99	144.73	−13 33 34.0	−744.1	69.54	16 14.8	59 31.2	
26	1 43.64	2.379	16 4 57.90	152.92	−18 4 16.5	−599.0	71.60	16 19.5	59 48.4	I. N.
27	2 42.18	2.493	17 7 36.26	159.88	−21 24 56.2	−395.5	73.35	16 20.8	59 53.1	I. N.
28	3 42.87	2.551	18 12 24.49	163.40	−23 15 26.3	−152.2	74.25	16 18.9	59 46.2	I. N. S.
29	4 44.02	2.529	19 17 39.79	162.05	−23 25 15.8	+102.3	74.00	16 14.5	59 30.1	I. S.
30	5 43.69	2.432	20 21 26.48	156.22	−21 56 22.3	336.8	72.62	16 8.4	59 7.7	I. S.
31	6 40.45	2.294	21 22 18.34	147.80	−19 1 37.7	596.9	70.57	16 1.3	58 41.3	I. S.
Nov. 1	7 33.75	2.150	22 19 41.26	139.10	−15 0 6.7	+670.0	68.35	15 53.5	58 12.8	I. S.
2	8 23.79	2.026	23 13 48.25	131.72	−10 12 23.6	760.5	66.39	15 45.5	57 43.3	I. S.
3	9 11.26	1.937	0 5 21.16	126.40	− 4 57 53.2	804.9	64.92	15 37.3	57 13.4	I. S.
4	9 57.08	1.887	0 55 14.05	123.38	+ 0 26 0.1	808.0	64.05	15 29.1	56 43.1	I. S.
5	10 42.13	1.874	1 44 21.66	122.59	5 43 40.4	774.3	63.80	15 20.9	56 13.2	I. S.
6	11 27.26	1.891	2 33 32.94	123.63	+10 40 55.5	+706.4	64.06	15 12.9	55 43.7	I. S.
7	12 13.08	1.930	3 23 26.18	125.98	15 4 42.6	607.5	64.69	15 5.3	55 15.8	II. S.
8	12 59.98	1.979	4 14 24.67	128.93	18 43 14.5	481.0	65.50	14 58.4	54 50.5	II. S.
9	13 48.05	2.024	5 6 33.26	131.68	21 26 26.3	331.8	66.28	14 52.8	54 29.7	II. S.
10	14 37.03	2.053	5 59 36.85	133.41	23 6 39.5	+167.2	66.80	14 48.7	54 14.7	II. S.
11	15 26.41	2.057	6 53 4.21	133.60	+23 39 28.3	− 3.8	66.93	14 46.6	54 7.3	II. S.
12	16 15.55	2.034	7 46 17.11	132.23	23 4 0.1	−172.3	66.64	14 47.1	54 9.0	II. S.
13	17 3.90	1.993	8 38 42.55	129.75	21 22 42.4	−331.8	66.04	14 50.4	54 20.9	II. S.
14	17 51.16	1.946	9 30 2.50	126.93	18 40 35.9	−476.0	65.32	14 56.6	54 43.7	II. S.
15	18 37.37	1.907	10 20 19.01	124.60	+15 4 21.7	−602.0	64.69	15 5.7	55 17.2	II. S.

AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Nov. 16	19 22.88	1.890	11 9 53.71	123.55	+10 41 45.2	−707.3	64.38	15 17.4	56 0.3	II. S.
17	20 8.33	1.904	11 59 24.92	124.40	5 41 43.0	−788.4	64.55	15 31.3	56 51.4	II. S.
18	20 54.58	1.957	12 49 43.78	127.59	+ 0 15 6.8	−838.8	65.34	15 46.5	57 47.2	II. S.
19	21 42.61	2.053	13 41 50.09	133.38	− 5 24 1.6	−849.1	66.79	16 1.7	58 42.9	II. S.
20	22 33.46	2.191	14 36 45.99	141.66	−10 57 8.7	−806.4	68.85	16 15.6	59 34.1	II. S.
21	23 27.99	2.357	15 35 23.71	151.66	−16 0 25.7	−698.1	71.31	16 26.6	60 14.4	
23	0 26.56	2.520	16 38 4.12	161.48	−20 6 2.5	−517.9	73.68	16 33.4	60 39.4	
24	1 28.55	2.632	17 44 10.21	168.27	−22 46 32.8	−275.9	75.32	16 35.3	60 46.3	I. S.
25	2 32.18	2.650	18 51 55.02	169.39	−23 42 31.5	− 1.8	75.64	16 32.2	60 35.2	I. S.
26	3 34.98	2.565	19 58 49.51	164.21	−22 49 24.9	+262.5	74.50	16 25.1	60 8.9	I. S.
27	4 34.76	2.409	21 2 42.68	154.75	−20 18 35.5	+482.5	72.29	16 15.1	59 32.1	I. S.
28	5 30.41	2.230	22 2 27.55	144.02	−16 31 33.6	642.7	69.67	16 3.5	58 49.5	I. S.
29	6 21.94	2.070	22 58 4.52	134.39	−11 52 24.1	744.1	67.23	15 51.4	58 5.2	I. S.
30	7 10.09	1.950	23 50 17.48	127.18	− 6 42 57.2	795.6	65.31	15 39.8	57 22.4	I. S.
Dec. 1	7 55.88	1.875	0 40 9.23	122.65	− 1 21 20.7	806.2	64.06	15 29.0	56 42.9	I. S.
2	8 40.41	1.843	1 28 44.92	120.76	+ 3 57 21.8	+782.0	63.49	15 19.3	56 7.4	I. S.
3	9 24.67	1.851	2 17 4.35	121.21	9 0 7.5	726.9	63.55	15 10.9	55 36.2	I. S.
4	10 9.48	1.888	3 5 57.00	123.43	13 34 53.8	642.3	64.09	15 3.5	55 9.1	I. S.
5	10 55.42	1.943	3 55 57.58	126.73	17 30 9.4	529.5	64.92	14 57.2	54 46.2	I. S.
6	11 42.75	2.000	4 47 21.63	130.22	20 35 7.0	391.4	65.82	14 52.1	54 27.3	I. S.
7	12 31.34	2.045	5 40 1.78	132.91	+22 40 30.3	+232.8	66.54	14 48.2	54 12.8	II. S.
8	13 20.71	2.063	6 33 28.50	133.99	23 39 47.7	+ 62.3	66.85	14 45.6	54 3.3	II. S.
9	14 10.12	2.048	7 26 57.64	133.06	23 30 15.5	−109.3	66.69	14 44.7	54 0.0	II. S.
10	14 58.82	2.006	8 19 44.05	130.53	22 13 20.8	−273.0	66.09	14 45.6	54 3.4	II. S.
11	15 46.27	1.947	9 11 15.56	127.02	19 54 3.9	−420.4	65.23	14 48.8	54 15.1	II. S.
12	16 32.30	1.890	10 1 21.71	123.58	+16 39 40.7	−548.0	64.38	14 54.5	54 36.0	II. S.
13	17 17.13	1.849	10 50 15.32	121.13	12 38 32.1	−654.0	63.75	15 2.8	55 6.5	II. S.
14	18 1.30	1.837	11 38 29.43	120.40	7 59 22.4	−738.0	63.58	15 13.9	55 47.2	II. S.
15	18 45.63	1.864	12 26 52.93	121.99	+ 2 51 27.4	−797.3	64.00	15 27.4	56 36.9	II. S.
16	19 31.13	1.936	13 16 26.80	126.33	− 2 34 31.6	−827.1	65.12	15 42.8	57 33.5	II. S.
17	20 18.94	2.058	14 8 20.19	133.63	− 8 4 58.1	−817.5	66.99	15 59.2	58 33.9	II. S.
18	21 10.25	2.226	15 3 43.59	143.73	−13 21 33.8	−755.3	69.50	16 15.3	59 32.9	II. S.
19	22 5.99	2.422	16 3 33.53	155.55	−18 0 8.1	−625.3	72.34	16 29.4	60 24.5	II. S.
20	23 6.41	2.606	17 8 5.27	166.67	−21 31 43.3	−420.5	74.95	16 39.6	61 2.0	
22	0 10.53	2.718	18 16 19.55	173.47	−23 28 3.6	−154.7	76.52	16 44.6	61 20.4	
23	1 15.97	2.712	19 25 54.77	173.14	−23 31 12.7	+137.3	76.47	16 43.6	61 16.7	I. S.
24	2 19.85	2.592	20 33 54.00	165.80	−21 41 37.9	402.2	74.81	16 36.9	60 52.0	I. S.
25	3 19.89	2.405	21 38 1.78	154.50	−18 17 36.9	605.8	72.18	16 25.7	60 10.9	I. S.
26	4 15.21	2.209	22 37 26.67	142.75	−13 46 38.9	737.2	69.33	16 11.6	59 19.3	I. S.
27	5 6.17	2.046	23 32 29.53	132.93	− 8 36 17.6	804.8	66.86	15 56.4	58 23.4	I. S.
28	5 53.78	1.930	0 24 10.06	125.98	− 3 9 29.7	+821.9	65.06	15 41.5	57 28.7	I. S.
29	6 39.21	1.864	1 13 40.04	122.01	+ 2 16 5.0	800.3	63.99	15 27.7	56 38.1	I. S.
30	7 23.63	1.844	2 2 8.93	120.81	7 26 43.5	748.0	63.63	15 15.7	55 54.0	I. S.
31	8 8.03	1.862	2 50 37.19	121.88	12 11 1.8	669.3	63.87	15 5.8	55 17.6	I. S.
32	8 53.21	1.907	3 39 52.04	124.57	+16 18 39.0	+565.0	64.52	14 57.8	54 48.3	I. S.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Jan. 0	0 11.8	18 54 4.33	-24 46 8.4	6.2	2.3	0.17	Feb. 15	0 3.7	21 47 17.58	- 9 24 2.2	13.8	5.2	0.35
1	0 15.0	19 1 13.10	24 39 22.5	6.2	2.3	0.17	15	23 55.5	21 42 59.44	9 47 2.9	13.9	5.2	0.35
2	0 18.2	19 8 22.46	24 31 5.0	6.2	2.3	0.17	16	23 47.4	21 38 50.08	10 11 18.2	13.9	5.2	0.36
3	0 21.5	19 15 32.24	24 21 15.1	6.2	2.4	0.17	17	23 39.5	21 34 54.94	10 36 12.3	13.8	5.2	0.36
4	0 24.7	19 22 42.25	24 9 52.0	6.3	2.4	0.17	18	23 32.0	21 31 18.61	11 1 12.4	13.7	5.2	0.35
5	0 27.9	19 29 52.28	-23 56 54.8	6.3	2.4	0.17	19	23 24.9	21 28 4.81	-11 25 49.7	13.6	5.2	0.35
6	0 31.1	19 37 2.14	23 42 22.9	6.3	2.4	0.17	20	23 18.2	21 25 16.31	11 49 39.5	13.5	5.1	0.35
7	0 34.3	19 44 11.58	23 26 16.1	6.4	2.4	0.17	21	23 11.9	21 22 55.01	12 12 21.4	13.3	5.1	0.34
8	0 37.5	19 51 20.34	23 8 34.2	6.4	2.4	0.17	22	23 6.1	21 21 2.02	12 33 39.8	13.1	5.0	0.34
9	0 40.7	19 58 28.17	22 49 16.9	6.5	2.5	0.18	23	23 0.7	21 19 37.74	12 53 22.9	12.9	4.9	0.33
10	0 43.9	20 5 34.75	-22 28 24 3	6.5	2.5	0.18	24	22 55.9	21 18 42.03	-13 11 21.9	12.7	4.8	0.33
11	0 47.0	20 12 39.74	22 5 56.7	6.6	2.5	0.18	25	22 51.5	21 18 14.26	13 27 30.7	12.5	4.7	0.32
12	0 50.0	20 19 42.78	21 41 54.8	6.6	2.5	0.18	26	22 47.5	21 18 13.49	13 41 45.9	12.2	4.6	0.32
13	0 53.0	20 26 43.43	21 16 19.6	6.7	2.5	0.18	27	22 44.0	21 18 38.55	13 54 5.6	12.0	4.5	0.31
14	0 56.0	20 33 41.21	20 49 12.3	6.8	2.6	0.19	28	22 40.9	21 19 28.15	14 4 28.8	11.8	4.5	0.31
15	0 59.0	20 40 35.59	-20 20 35.1	6.9	2.6	0.19	Mar. 1	22 38.2	21 20 40.88	-14 12 56.0	11.6	4.4	0.30
16	1 1.9	20 47 25.96	19 50 30.5	6.9	2.6	0.19	2	22 35.8	21 22 15.26	14 19 28.2	11.4	4.3	0.30
17	1 4.8	20 54 11.64	19 19 1.4	7.0	2.6	0.19	3	22 33.8	21 24 9.86	14 24 6.8	11.2	4.2	0.29
18	1 7.5	21 0 51.83	18 46 11.6	7.1	2.7	0.19	4	22 32.1	21 26 23.28	14 26 53.7	11.0	4.1	0.29
19	1 10.1	21 7 25.64	18 12 6.2	7.2	2.7	0.20	5	22 30.6	21 28 54.18	14 27 50.9	10.8	4.1	0.28
20	1 12.6	21 13 52.05	-17 36 50.9	7.4	2.8	0.20	6	22 29.5	21 31 41.25	-14 27 0.5	10.6	4.0	0.28
21	1 14.9	21 20 9.88	17 0 33.1	7.5	2.8	0.20	7	22 28.6	21 34 43.28	14 24 24.5	10.4	3.9	0.27
22	1 17.1	21 26 17.85	16 23 21.0	7.6	2.9	0.20	8	22 27.9	21 37 59.16	14 20 5.2	10.3	3.9	0.27
23	1 19.1	21 32 14.47	15 45 24.7	7.8	2.9	0.20	9	22 27.4	21 41 27.82	14 14 4.6	10.1	3.8	0.26
24	1 20.9	21 37 58.05	15 6 55.9	7.9	3.0	0.21	10	22 27.2	21 45 8.30	14 6 24.7	9.9	3.7	0.26
25	1 22.5	21 43 26.75	-14 28 8.2	8.1	3.0	0.21	11	22 27.1	21 48 59.71	-13 57 7.5	9.7	3.7	0.25
26	1 23.8	21 48 38.53	13 49 17.4	8.3	3.1	0.21	12	22 27.2	21 53 1.24	13 46 14.9	9.5	3.6	0.25
27	1 24.7	21 53 31.16	13 10 41.3	8.5	3.1	0.22	13	22 27.5	21 57 12.12	13 33 48.6	9.3	3.5	0.24
28	1 25.2	21 58 2.21	12 32 39.4	8.7	3.2	0.22	14	22 27.8	22 1 31.67	13 19 50.3	9.2	3.5	0.24
29	1 25.4	22 2 9.15	11 55 33.2	9.0	3.3	0.23	15	22 28.3	22 5 59.28	13 4 21.7	9.1	3.4	0.23
30	1 25.1	22 5 49.40	-11 19 46.6	9.2	3.5	0.23	16	22 29.0	22 10 34.39	-12 47 24.3	9.0	3.4	0.23
31	1 24.3	22 9 0.26	10 45 44.7	9.5	3.6	0.24	17	22 29.8	22 15 16.49	12 28 59.7	8.8	3.4	0.23
Feb. 1	1 23.0	22 11 39.08	10 13 53.3	9.8	3.7	0.25	18	22 30.6	22 20 5.13	12 9 9.4	8.7	3.3	0.23
2	1 21.2	22 13 43.42	9 44 39.2	10.1	3.8	0.25	19	22 31.6	22 24 59.90	11 47 54.5	8.6	3.3	0.22
3	1 18.7	22 15 11.17	9 18 28.4	10.5	3.9	0.26	20	22 32.7	22 30 0.44	11 25 16.4	8.5	3.2	0.22
4	1 15.6	22 16 0.49	- 8 55 45.9	10.8	4.0	0.27	21	22 33.8	22 35 6.43	-11 1 16.5	8.4	3.2	0.22
5	1 11.9	22 16 10.16	8 36 54.6	11.1	4.2	0.28	22	22 35.1	22 40 17.59	10 35 56.1	8.3	3.2	0.22
6	1 7.4	22 15 39.66	8 22 14.0	11.5	4.3	0.29	23	22 36.4	22 45 33.67	10 9 16.3	8.2	3.1	0.21
7	1 2.3	22 14 29.33	8 11 59.3	11.8	4.4	0.30	24	22 37.8	22 50 54.46	9 41 18.3	8.1	3.1	0.21
8	0 56.5	22 12 40.45	8 6 19.7	12.2	4.6	0.30	25	22 39.2	22 56 19.77	9 12 3.1	8.0	3.0	0.21
9	0 50.2	22 10 15.36	- 8 5 17.8	12.5	4.7	0.31	26	22 40.7	23 1 49.47	- 8 41 31.9	7.9	3.0	0.20
10	0 43.3	22 7 17.45	8 8 50.1	12.8	4.8	0.32	27	22 42.3	23 7 23.45	8 9 45.9	7.8	2.9	0.20
11	0 35.9	22 3 51.11	8 16 44.4	13.1	4.9	0.33	28	22 44.1	23 13 1.63	7 36 46.1	7.7	2.9	0.20
12	0 28.2	22 0 1.71	8 28 41.3	13.3	5.0	0.33	29	22 45.9	23 18 43.93	7 2 33.5	7.6	2.9	0.20
13	0 20.2	21 55 55.32	8 44 15.0	13.5	5.1	0.34	30	22 47.7	23 24 30.31	6 27 9.2	7.6	2.8	0.19
14	0 12.0	21 51 38.38	- 9 2 53.8	13.7	5.2	0.35	31	22 49.6	23 30 20.76	- 5 50 34.5	7.5	2.8	0.19
15	0 3.7	21 47 17.58	- 9 24 2.2	13.8	5.2	0.35	32	22 51.5	23 36 15.31	- 5 12 50.3	7.4	2.8	0.19

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Apr. 1	22 51.5	23 36 15.31	− 5 12 50.3	7.4	2.8	0.19	May 18	1 27.1	5 13 39.71	+25 23 16.7	9.3	3.4	0.26
2	22 53.5	23 42 13.99	4 33 57.9	7.4	2.8	0.19	19	1 28.9	5 19 26.80	25 27 39.0	9.5	3.5	0.27
3	22 55.6	23 48 16.86	3 53 58.5	7.3	2.8	0.19	20	1 30.5	5 24 58.23	25 30 8.2	9.8	3.6	0.27
4	22 57.7	23 54 24.01	3 12 53.1	7.3	2.7	0.18	21	1 31.9	5 30 13.56	25 30 50.2	10.0	3.7	0.28
5	23 0.1	0 0 35.54	2 30 42.9	7.2	2.7	0.18	22	1 32.9	5 35 12.38	25 29 50.8	10.2	3.8	0.29
6	23 2.4	0 6 51.55	− 1 47 29.6	7.2	2.7	0.18	23	1 33.6	5 39 54.27	+25 27 15.3	10.5	3.9	0.29
7	23 4.8	0 13 12.22	1 3 14.8	7.1	2.7	0.18	24	1 34.1	5 44 18.81	25 23 9.3	10.7	4.0	0.30
8	23 7.2	0 19 37.71	− 0 17 59.9	7.0	2.6	0.18	25	1 34.3	5 48 25.61	25 17 38.3	11.0	4.1	0.30
9	23 9.8	0 26 8.18	+ 0 28 13.3	7.0	2.6	0.17	26	1 34.2	5 52 14.29	25 10 47.7	11.2	4.2	0.31
10	23 12.5	0 32 43.81	1 15 22.7	6.9	2.6	0.17	27	1 33.7	5 55 44.46	25 2 42.8	11.5	4.3	0.32
11	23 15.2	0 39 24.79	+ 2 3 26.0	6.9	2.6	0.17	28	1 32.9	5 58 55.78	+24 53 28.7	11.8	4.4	0.32
12	23 18.0	0 46 11.34	2 52 20.8	6.9	2.6	0.17	29	1 31.9	6 1 47.90	24 43 10.5	12.0	4.5	0.33
13	23 20.9	0 53 3.68	3 42 4.0	6.8	2.6	0.17	30	1 30.5	6 4 20.49	24 31 53.1	12.3	4.6	0.34
14	23 23.9	1 0 2.00	4 32 32.2	6.8	2.6	0.17	31	1 28.8	6 6 33.27	24 19 41.4	12.6	4.7	0.35
15	23 27.1	1 7 6.49	5 23 41.8	6.8	2.5	0.17	June 1	1 26.8	6 8 26.02	24 6 40.3	12.9	4.8	0.35
16	23 30.3	1 14 17.33	+ 6 15 28.5	6.7	2.5	0.17	2	1 24.4	6 9 58.57	+23 52 54.7	13.2	4.9	0.36
17	23 33.6	1 21 34.72	7 7 47.0	6.7	2.5	0.17	3	1 21.6	6 11 10.80	23 38 29.4	13.5	5.0	0.37
18	23 37.0	1 28 58.76	8 0 31.9	6.7	2.5	0.17	4	1 18.5	6 12 2.73	23 23 29.2	13.7	5.1	0.37
19	23 40.6	1 36 29.52	8 53 37.0	6.7	2.5	0.17	5	1 15.2	6 12 34.45	23 7 59.0	14.0	5.2	0.38
20	23 44.3	1 44 7.03	9 46 55.0	6.7	2.5	0.17	6	1 11.4	6 12 46.17	22 52 3.9	14.3	5.3	0.39
21	23 48.2	1 51 51.27	+10 40 17.7	6.7	2.5	0.17	7	1 7.3	6 12 38.30	+22 35 48.7	14.6	5.4	0.39
22	23 52.1	1 59 42.09	11 33 36.2	6.7	2.5	0.17	8	1 2.9	6 12 11.37	22 19 18.9	14.8	5.5	0.40
23	23 56.1	2 7 39.25	12 26 40.6	6.7	2.5	0.17	9	0 58.3	6 11 26.09	22 2 40.1	15.0	5.6	0.40
25	0 0.1	2 15 42.41	13 19 20.3	6.7	2.5	0.17	10	0 53.3	6 10 23.38	21 45 58.2	15.2	5.7	0.41
26	0 4.3	2 23 51.12	14 11 23.6	6.7	2.5	0.17	11	0 48.0	6 9 4.36	21 29 19.1	15.4	5.8	0.41
27	0 8.6	2 32 4.81	+15 2 38.7	6.7	2.5	0.17	12	0 42.5	6 7 30.39	+21 12 49.4	15.6	5.8	0.42
28	0 12.9	2 40 22.74	15 52 52.8	6.8	2.5	0.18	13	0 36.7	6 5 43.05	20 56 35.6	15.7	5.9	0.42
29	0 17.3	2 48 44.06	16 41 53.3	6.8	2.6	0.18	14	0 30.8	6 3 44.05	20 40 44.7	15.8	5.9	0.43
30	0 21.7	2 57 7.82	17 29 27.6	6.9	2.6	0.18	15	0 24.8	6 1 35.36	20 25 23.7	15.9	6.0	0.43
May 1	0 26.2	3 5 32.94	18 15 23.3	6.9	2.6	0.18	16	0 18.6	5 59 19.08	20 10 40.3	15.9	6.0	0.43
2	0 30.7	3 13 58.25	+18 59 28.8	6.9	2.6	0.19	17	0 12.3	5 56 57.47	+19 56 42.1	16.0	6.1	0.43
3	0 35.1	3 22 22.52	19 41 33.7	7.0	2.7	0.19	18	0 6.0	5 54 32.86	19 43 36.5	16.0	6.1	0.42
4	0 39.5	3 30 44.53	20 21 28.5	7.1	2.7	0.19	18	23 59.6	5 52 7.64	19 31 30.3	15.9	6.0	0.42
5	0 43.9	3 39 3.01	20 59 5.4	7.2	2.8	0.20	19	23 53.3	5 49 44.24	19 20 30.4	15.9	6.0	0.42
6	0 48.2	3 47 16.72	21 34 18.2	7.4	2.8	0.20	20	23 47.1	5 47 25.02	19 10 43.2	15.8	5.9	0.41
7	0 52.4	3 55 24.45	+22 7 1.9	7.5	2.8	0.20	21	23 41.0	5 45 12.25	+19 2 14.4	15.6	5.9	0.41
8	0 56.4	4 3 25.06	22 37 13.3	7.7	2.9	0.21	22	23 35.0	5 43 8.12	18 55 8.7	15.5	5.8	0.41
9	1 0.3	4 11 17.47	23 4 51.2	7.8	2.9	0.21	23	23 29.2	5 41 14.65	18 49 30.2	15.3	5.8	0.40
10	1 4.1	4 19 0.67	23 29 55.2	7.9	3.0	0.22	24	23 23.5	5 39 33.73	18 45 21.9	15.1	5.7	0.40
11	1 7.7	4 26 33.77	23 52 26.2	8.0	3.0	0.22	25	23 18.1	5 38 7.03	18 42 45.3	14.9	5.6	0.39
12	1 11.1	4 33 55.91	+24 12 26.5	8.2	3.1	0.23	26	23 13.0	5 36 56.05	+18 41 41.1	14.6	5.5	0.39
13	1 14.3	4 41 6.31	24 29 59.1	8.4	3.1	0.23	27	23 8.2	5 36 2.04	18 42 9.0	14.3	5.4	0.38
14	1 17.3	4 48 4.27	24 45 7.8	8.5	3.2	0.24	28	23 3.7	5 35 26.13	18 44 7.7	14.0	5.3	0.38
15	1 20.1	4 54 49.16	24 57 56.8	8.7	3.2	0.24	29	22 59.5	5 35 9.22	18 47 34.5	13.7	5.2	0.37
16	1 22.7	5 1 20.40	25 8 31.1	8.9	3.3	0.25	30	22 55.6	5 35 12.05	18 52 26.1	13.5	5.1	0.36
17	1 25.1	5 7 37.42	+25 16 55.9	9.1	3.4	0.25	31	22 52.1	5 35 35.25	+18 58 38.2	13.2	5.0	0.35
18	1 27.1	5 13 39.71	+25 23 16.7	9.3	3.4	0.26	32	22 48.9	5 36 19.26	+19 6 5.7	12.9	4.9	0.35

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
July 1	22 52.1	5 35 35.25	+18 58 38.2	13.2	5.0	0.35	Aug. 17	0 43.4	10 28 36.18	+11 8 20.5	6.6	2.5	0.17
2	22 48.9	5 36 19.26	19 6 5.7	12.9	4.9	0.35	18	0 46.3	10 35 25.16	10 23 39.7	6.6	2.5	0.17
3	22 46.0	5 37 24.43	19 14 43.1	12.5	4.8	0.34	19	0 49.0	10 42 6.45	9 38 41.3	6.6	2.5	0.17
4	22 43.5	5 38 51.03	19 24 24.0	12.2	4.7	0.33	20	0 51.6	10 48 40.28	8 53 29.8	6.6	2.5	0.17
5	22 41.4	5 40 39.24	19 35 1.1	11.9	4.6	0.32	21	0 54.1	10 55 6.91	8 8 9.5	6.7	2.5	0.17
6	22 39.7	5 42 49.18	+19 46 26.7	11.6	4.5	0.31	22	0 56.5	11 1 26.59	+ 7 22 44.4	6.7	2.5	0.17
7	22 38.3	5 45 20.90	19 58 33.1	11.3	4.3	0.31	23	0 58.8	11 7 39.56	6 37 17.9	6.7	2.5	0.17
8	22 37.2	5 48 14.40	20 11 11.7	11.0	4.2	0.30	24	1 0.9	11 13 46.07	5 51 53.4	6.8	2.5	0.17
9	22 36.5	5 51 29.67	20 24 13.5	10.7	4.1	0.29	25	1 3.0	11 19 46.37	5 6 34.1	6.8	2.6	0.17
10	22 36.2	5 55 6.64	20 37 29.3	10.4	4.0	0.28	26	1 5.0	11 25 40.67	4 21 22.8	6.9	2.6	0.17
11	22 36.1	5 59 5.24	+20 50 49.2	10.1	3.9	0.28	27	1 6.8	11 31 29.17	+ 3 36 22.3	6.9	2.6	0.18
12	22 36.5	6 3 25.36	21 4 2.8	9.9	3.8	0.27	28	1 8.6	11 37 12.05	2 51 35.1	7.0	2.6	0.18
13	22 37.3	6 8 6.85	21 16 59.6	9.6	3.7	0.26	29	1 10.3	11 42 49.52	2 7 3.5	7.0	2.6	0.18
14	22 38.4	6 13 9.50	21 29 28.5	9.4	3.6	0.26	30	1 11.8	11 48 21.74	1 22 50.0	7.1	2.6	0.18
15	22 39.8	6 18 33.02	21 41 18.1	9.2	3.5	0.25	31	1 13.3	11 53 48.86	+ 0 38 56.8	7.1	2.7	0.18
16	22 41.6	6 24 17.11	+21 52 16.8	9.0	3.4	0.25	Sept. 1	1 14.7	11 59 10.99	− 0 4 34.1	7.2	2.7	0.18
17	22 43.7	6 30 21.34	22 2 12.5	8.8	3.4	0.24	2	1 16.1	12 4 28.26	0 47 40.5	7.2	2.7	0.18
18	22 46.2	6 36 45.19	22 10 53.1	8.6	3.3	0.24	3	1 17.4	12 9 40.75	1 30 20.3	7.3	2.7	0.18
19	22 49.0	6 43 28.00	22 18 6.3	8.4	3.2	0.23	4	1 18.5	12 14 48.52	2 12 31.5	7.4	2.8	0.18
20	22 52.1	6 50 28.98	22 23 40.1	8.2	3.1	0.23	5	1 19.6	12 19 51.64	2 54 12.1	7.5	2.8	0.19
21	22 55.4	6 57 47.19	+22 27 23.0	8.0	3.1	0.22	6	1 20.7	12 24 50.11	− 3 35 19.9	7.5	2.8	0.19
22	22 59.0	7 5 21.50	22 29 3.7	7.9	3.0	0.22	7	1 21.7	12 29 43.94	4 15 53.0	7.6	2.9	0.19
23	23 2.8	7 13 10.62	22 28 32.1	7.7	3.0	0.21	8	1 22.6	12 34 33.11	4 55 49.3	7.7	2.9	0.19
24	23 6.9	7 21 13.14	22 25 39.2	7.5	2.9	0.21	9	1 23.4	12 39 17.55	5 35 6.6	7.8	2.9	0.20
25	23 11.2	7 29 27.42	22 20 17.1	7.4	2.8	0.21	10	1 24.1	12 43 57.19	6 13 42.8	7.9	3.0	0.20
26	23 15.7	7 37 51.71	+22 12 19.9	7.3	2.8	0.20	11	1 24.7	12 48 31.90	− 6 51 35.5	7.9	3.0	0.20
27	23 20.3	7 46 24.17	22 1 43.6	7.2	2.7	0.20	12	1 25.2	12 53 1.53	7 28 42.1	8.0	3.0	0.21
28	23 25.0	7 55 2.92	21 48 25.9	7.1	2.7	0.19	13	1 25.7	12 57 25.90	8 5 0.1	8.1	3.0	0.21
29	23 29.7	8 3 46.01	21 32 26.6	7.0	2.6	0.19	14	1 26.1	13 1 44.76	8 40 26.6	8.2	3.1	0.21
30	23 34.5	8 12 31.57	21 13 47.7	7.0	2.6	0.19	15	1 26.4	13 5 57.82	9 14 58.8	8.3	3.1	0.21
31	23 39.3	8 21 17.82	+20 52 33.2	6.9	2.6	0.19	16	1 26.5	13 10 4.77	− 9 48 33.3	8.5	3.2	0.22
Aug. 1	23 44.1	8 30 3.05	20 28 48.4	6.8	2.5	0.18	17	1 26.6	13 14 5.21	10 21 6.8	8.6	3.2	0.22
2	23 48.9	8 38 45.72	20 2 39.9	6.8	2.5	0.18	18	1 26.5	13 17 58.70	10 52 35.4	8.7	3.3	0.22
3	23 53.6	8 47 24.45	19 34 15.8	6.7	2.5	0.18	19	1 26.3	13 21 44.72	11 22 55.0	8.9	3.3	0.22
4	23 58.2	8 55 58.06	19 3 45.0	6.7	2.5	0.18	20	1 26.0	13 25 22.68	11 52 1.1	9.0	3.4	0.23
6	0 2.7	9 4 25.57	+18 31 16.7	6.6	2.5	0.18	21	1 25.5	13 28 51.92	−12 19 48.7	9.1	3.4	0.23
7	0 7.1	9 12 46.15	17 57 0.6	6.6	2.5	0.17	22	1 24.9	13 32 11.69	12 46 12.3	9.2	3.5	0.23
8	0 11.4	9 20 59.16	17 21 6.2	6.6	2.5	0.17	23	1 24.2	13 35 21.17	13 11 5.8	9.4	3.5	0.24
9	0 15.5	9 29 4.14	16 43 43.1	6.5	2.5	0.17	24	1 23.2	13 38 19.41	13 34 22.6	9.6	3.6	0.24
10	0 19.5	9 37 0.76	16 5 0.7	6.5	2.5	0.17	25	1 22.0	13 41 5.37	13 55 55.1	9.8	3.7	0.25
11	0 23.3	9 44 48.78	+15 25 7.6	6.5	2.5	0.17	26	1 20.7	13 43 37.90	−14 15 35.1	10.0	3.7	0.26
12	0 27.0	9 52 28.09	14 44 12.4	6.5	2.5	0.17	27	1 19.0	13 45 55.77	14 33 13.4	10.2	3.8	0.26
13	0 30.5	9 59 58.72	14 2 22.8	6.5	2.5	0.17	28	1 17.1	13 47 57.63	14 48 40.0	10.4	3.9	0.27
14	0 34.0	10 7 20.70	13 19 46.2	6.5	2.5	0.17	29	1 14.9	13 49 42.01	15 1 43.9	10.6	4.0	0.28
15	0 37.3	10 14 34.16	12 36 29.5	6.5	2.5	0.17	30	1 12.5	13 51 7.38	15 12 12.9	10.8	4.1	0.28
16	0 40.4	10 21 39.25	+11 52 38.9	6.5	2.5	0.17	31	1 9.6	13 52 12.14	−15 19 53.8	11.1	4.2	0.29
17	0 43.4	10 28 36.18	+11 8 20.5	6.6	2.5	0.17	32	1 6.3	13 52 54.67	−15 24 32.5	11.3	4.2	0.30

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Oct. 1	1 9.6	13 52 12.14	−15 19 53.8	11.1	4.2	0.29	Nov. 15	22 58.1	14 41 46.82	−14 24 47.3	6.8	2.6	0.17
2	1 6.3	13 52 54.67	15 24 32.5	11.3	4.2	0.30	16	23 0.3	14 47 53.24	14 59 30.1	6.7	2.5	0.17
3	1 2.6	13 53 13.35	15 25 53.7	11.5	4.3	0.30	17	23 2.5	14 54 2.14	15 33 42.3	6.6	2.5	0.17
4	0 58.5	13 53 6.64	15 23 42.2	11.7	4.4	0.31	18	23 4.7	15 0 13.37	16 7 20.1	6.6	2.5	0.17
5	0 54.1	13 52 33.18	15 17 42.5	11.9	4.4	0.31	19	23 7.0	15 6 26.82	16 40 19.8	6.5	2.4	0.17
6	0 49.2	13 51 31.88	−15 7 39.6	12.2	4.5	0.32	20	23 9.3	15 12 42.38	−17 12 38.3	6.5	2.4	0.17
7	0 43.8	13 50 2.03	14 53 20.1	12.4	4.6	0.32	21	23 11.6	15 18 59.98	17 44 12.4	6.4	2.4	0.17
8	0 37.9	13 48 3.53	14 34 33.6	12.6	4.7	0.33	22	23 14.0	15 25 19.58	18 14 59.6	6.4	2.4	0.17
9	0 31.5	13 45 36.94	14 11 14.2	12.8	4.8	0.33	23	23 16.4	15 31 41.15	18 44 57.4	6.3	2.4	0.17
10	0 24.7	13 42 43.71	13 43 22.1	13.0	4.8	0.33	24	23 18.8	15 38 4.67	19 14 3.6	6.3	2.4	0.17
11	0 17.5	13 39 26.29	−13 11 6.3	13.1	4.9	0.34	25	23 21.3	15 44 30.12	−19 42 16.2	6.3	2.4	0.17
12	0 10.0	13 35 48.21	12 34 45.4	13.2	4.9	0.34	26	23 23.8	15 50 57.50	20 9 33.0	6.2	2.3	0.17
13	0 2.1	13 31 54.14	11 54 49.8	13.3	5.0	0.34	27	23 26.4	15 57 26.81	20 35 52.1	6.2	2.3	0.17
13	23 54.1	13 27 49.81	11 12 1.8	13.3	5.0	0.34	28	23 29.0	16 3 58.05	21 1 11.8	6.2	2.3	0.17
14	23 46.1	13 23 41.73	10 27 15.3	13.2	5.0	0.34	29	23 31.6	16 10 31.24	21 25 30.4	6.2	2.3	0.17
15	23 38.1	13 19 37.03	− 9 41 33.6	13.1	5.0	0.33	30	23 34.2	16 17 6.35	−21 48 46.3	6.1	2.3	0.17
16	23 30.2	13 15 43.01	8 56 6.2	13.0	4.9	0.33	Dec. 1	23 36.9	16 23 43.40	22 10 57.8	6.1	2.3	0.17
17	23 22.7	13 12 6.81	8 12 5.0	12.9	4.9	0.33	2	23 39.6	16 30 22.38	22 32 3.4	6.1	2.3	0.17
18	23 15.6	13 8 54.94	7 30 39.0	12.7	4.8	0.32	3	23 42.3	16 37 3.32	22 52 1.4	6.1	2.3	0.17
19	23 9.0	13 6 12.94	6 52 50.7	12.4	4.7	0.32	4	23 45.1	16 43 46.15	23 10 50.6	6.1	2.3	0.17
20	23 2.9	13 4 5.22	− 6 19 32.5	12.0	4.6	0.31	5	23 47.9	16 50 30.89	−23 28 29.3	6.1	2.3	0.17
21	22 57.5	13 2 34.83	5 51 24.5	11.7	4.5	0.30	6	23 50.7	16 57 17.52	23 44 56.1	6.1	2.3	0.17
22	22 52.7	13 1 43.56	5 28 53.3	11.4	4.3	0.29	7	23 53.5	17 4 6.00	24 0 9.6	6.1	2.3	0.17
23	22 48.6	13 1 31.94	5 12 12.6	11.1	4.2	0.28	8	23 56.4	17 10 56.30	24 14 8.3	6.1	2.3	0.17
24	22 45.1	13 1 59.42	5 1 25.0	10.7	4.1	0.27	9	23 59.3	17 17 48.37	24 26 50.9	6.1	2.3	0.17
25	22 42.2	13 3 4.58	− 4 56 22.5	10.4	4.0	0.27	11	0 2.3	17 24 42.14	−24 38 16.0	6.1	2.3	0.17
26	22 39.9	13 4 45.34	4 56 49.9	10.1	3.8	0.26	12	0 5.2	17 31 37.56	24 48 22.1	6.1	2.3	0.17
27	22 38.3	13 6 59.12	5 2 25.7	9.8	3.7	0.25	13	0 8.2	17 38 34.54	24 57 7.8	6.1	2.3	0.17
28	22 37.1	13 9 43.13	5 12 45.2	9.5	3.6	0.24	14	0 11.2	17 45 33.00	25 4 31.7	6.2	2.3	0.17
29	22 36.4	13 12 54.43	5 27 21.5	9.2	3.5	0.24	15	0 14.3	17 52 32.81	25 10 32.6	6.2	2.3	0.17
30	22 36.1	13 16 30.09	− 5 45 46.5	9.0	3.4	0.23	16	0 17.4	17 59 33.87	−25 15 9.2	6.2	2.3	0.17
31	22 36.0	13 20 27.33	6 7 32.6	8.7	3.3	0.23	17	0 20.5	18 6 36.05	25 18 20.1	6.2	2.3	0.17
Nov. 1	22 36.3	13 24 43.54	6 32 13.2	8.5	3.2	0.22	18	0 23.6	18 13 39.19	25 20 4.1	6.2	2.4	0.17
2	22 37.0	13 29 16.27	6 59 23.2	8.3	3.1	0.22	19	0 26.7	18 20 43.10	25 20 19.9	6.3	2.4	0.17
3	22 37.9	13 34 3.34	7 28 39.3	8.1	3.1	0.21	20	0 29.9	18 27 47.61	25 19 6.5	6.3	2.4	0.18
4	22 38.9	13 39 2.86	− 7 59 40.0	7.9	3.0	0.21	21	0 33.0	18 34 52.51	−25 16 22.7	6.3	2.4	0.18
5	22 40.1	13 44 13.13	8 32 6.1	7.7	3.0	0.20	22	0 36.1	18 41 57.55	25 12 7.7	6.4	2.4	0.18
6	22 41.4	13 49 32.62	9 5 40.3	7.6	2.9	0.20	23	0 39.3	18 49 2.47	25 6 20.5	6.4	2.4	0.18
7	22 42.9	13 55 0.08	9 40 7.1	7.4	2.9	0.20	24	0 42.4	18 56 7.00	24 59 0.5	6.5	2.4	0.18
8	22 44.6	14 0 34.45	10 15 12.9	7.3	2.8	0.19	25	0 45.5	19 3 10.80	24 50 6.9	6.6	2.5	0.18
9	22 46.3	14 6 14.80	−10 50 45.5	7.2	2.8	0.19	26	0 48.6	19 10 13.52	−24 39 39.3	6.6	2.5	0.18
10	22 48.1	14 12 0.34	11 26 34.5	7.1	2.8	0.18	27	0 51.6	19 17 14.76	24 27 37.6	6.7	2.5	0.18
11	22 50.0	14 17 50.43	12 2 30.0	7.0	2.7	0.18	28	0 54.6	19 24 14.07	24 14 1.7	6.8	2.5	0.18
12	22 51.9	14 23 44.53	12 38 23.9	6.9	2.7	0.18	29	0 57.6	19 31 10.97	23 58 51.9	6.8	2.5	0.19
13	22 53.9	14 29 42.20	13 14 8.9	6.9	2.7	0.18	30	1 0.6	19 38 4.89	23 42 8.8	6.9	2.6	0.19
14	22 56.0	14 35 43.06	−13 49 38.5	6.8	2.6	0.18	31	1 3.5	19 44 55.21	−23 23 53.6	7.0	2.6	0.19
15	22 58.1	14 41 46.82	−14 24 47.3	6.8	2.6	0.17	32	1 6.3	19 51 41.25	−23 4 7.7	7.1	2.6	0.19

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
Jan. 0	2 58.1	21 40 52.42	−15 46 24.9	8.4	8.1	0.56
1	2 58.8	21 45 28.85	15 21 6.9	8.5	8.2	0.57
2	2 59.4	21 50 3.69	14 55 26.3	8.6	8.2	0.57
3	3 0.0	21 54 36.95	14 29 23.6	8.6	8.3	0.57
4	3 0.6	21 59 8.66	14 3 0.1	8.7	8.4	0.57
5	3 1.2	22 3 38.80	−13 36 16.4	8.7	8.4	0.58
6	3 1.7	22 8 7.39	13 9 13.4	8.8	8.5	0.58
7	3 2.2	22 12 34.43	12 41 51.9	8.8	8.6	0.58
8	3 2.7	22 16 59.95	12 14 12.7	8.9	8.6	0.59
9	3 3.2	22 21 23.95	11 46 16.6	9.0	8.7	0.59
10	3 3.6	22 25 46.46	−11 18 4.3	9.0	8.8	0.59
11	3 4.0	22 30 7.49	10 49 36.6	9.1	8.8	0.60
12	3 4.4	22 34 27.05	10 20 54.4	9.1	8.9	0.60
13	3 4.8	22 38 45.16	9 51 58.5	9.2	8.9	0.60
14	3 5.2	22 43 1.83	9 22 49.8	9.3	9.0	0.61
15	3 5.5	22 47 17.10	− 8 53 28.8	9.3	9.0	0.61
16	3 5.8	22 51 30.98	8 23 56.5	9.4	9.1	0.61
17	3 6.0	22 55 43.50	7 54 13.6	9.5	9.2	0.62
18	3 6.2	22 59 54.67	7 24 20.8	9.6	9.2	0.62
19	3 6.4	23 4 4.52	6 54 18.9	9.6	9.3	0.62
20	3 6.6	23 8 13.07	− 6 24 8.7	9.7	9.4	0.63
21	3 6.8	23 12 20.36	5 53 50.8	9.8	9.4	0.63
22	3 7.0	23 16 26.39	5 23 26.0	9.9	9.5	0.64
23	3 7.1	23 20 31.19	4 52 55.1	10.0	9.6	0.64
24	3 7.2	23 24 34.78	4 22 18.8	10.0	9.7	0.65
25	3 7.3	23 28 37.18	− 3 51 37.6	10.1	9.8	0.65
26	3 7.4	23 32 38.42	3 20 52.4	10.2	9.8	0.66
27	3 7.4	23 36 38.51	2 50 3.8	10.3	9.9	0.66
28	3 7.5	23 40 37.46	2 19 12.7	10.4	10.0	0.67
29	3 7.5	23 44 35.28	1 48 19.8	10.4	10.1	0.67
30	3 7.5	23 48 31.98	− 1 17 25.6	10.5	10.2	0.68
31	3 7.5	23 52 27.59	0 46 31.0	10.6	10.3	0.68
Feb. 1	3 7.4	23 56 22.10	− 0 15 36.6	10.7	10.4	0.69
2	3 7.4	0 0 15.53	+ 0 15 16.7	10.8	10.4	0.70
3	3 7.3	0 4 7.87	0 46 8.3	10.9	10.5	0.70
4	3 7.3	0 7 59.12	+ 1 16 57.3	11.0	10.6	0.71
5	3 7.2	0 11 49.30	1 47 43.2	11.1	10.7	0.72
6	3 7.1	0 15 38.38	2 18 25.2	11.2	10.8	0.73
7	3 7.0	0 19 26.36	2 49 2.6	11.3	10.9	0.73
8	3 6.8	0 23 13.26	3 19 34.7	11.5	11.1	0.74
9	3 6.6	0 26 59.05	+ 3 50 0.8	11.6	11.2	0.75
10	3 6.4	0 30 43.73	4 20 20.2	11.7	11.3	0.75
11	3 6.2	0 34 27.29	4 50 32.0	11.8	11.4	0.76
12	3 5.9	0 38 9.71	5 20 35.8	11.9	11.5	0.77
13	3 5.6	0 41 50.98	5 50 30.7	12.1	11.6	0.78
14	3 5.3	0 45 31.09	+ 6 20 16.0	12.2	11.7	0.79
15	3 5.0	0 49 10.03	+ 6 49 51.1	12.3	11.8	0.80
Feb. 15	3 5.0	0 49 10.03	+ 6 49 51.1	12.3	11.8	0.80
16	3 4.7	0 52 47.79	7 19 15.4	12.5	12.0	0.81
17	3 4.4	0 56 24.34	7 48 28.1	12.6	12.1	0.82
18	3 4.0	0 59 59.65	8 17 28.7	12.7	12.2	0.83
19	3 3.7	1 3 33.70	8 46 16.6	12.8	12.3	0.83
20	3 3.3	1 7 6.46	+ 9 14 50.9	12.9	12.5	0.84
21	3 2.9	1 10 37.89	9 43 11.2	13.0	12.6	0.85
22	3 2.4	1 14 7.97	10 11 17.0	13.2	12.8	0.86
23	3 2.0	1 17 36.66	10 39 7.4	13.3	12.9	0.87
24	3 1.5	1 21 3.91	11 6 41.9	13.5	13.1	0.89
25	3 1.0	1 24 29.66	+11 33 59.7	13.7	13.2	0.90
26	3 0.5	1 27 53.86	12 1 0.4	13.8	13.4	0.91
27	2 59.9	1 31 16.45	12 27 43.2	14.0	13.5	0.92
28	2 59.3	1 34 37.36	12 54 7.6	14.2	13.7	0.94
Mar. 1	2 58.7	1 37 56.51	13 20 12.9	14.3	13.9	0.95
2	2 58.0	1 41 13.83	+13 45 58.4	14.5	14.0	0.96
3	2 57.3	1 44 29.24	14 11 23.5	14.7	14.2	0.97
4	2 56.6	1 47 42.62	14 36 27.4	14.9	14.4	0.99
5	2 55.8	1 50 53.88	15 1 9.5	15.1	14.6	1.00
6	2 55.0	1 54 2.92	15 25 29.0	15.3	14.8	1.02
7	2 54.2	1 57 9.62	+15 49 25.2	15.5	15.0	1.04
8	2 53.3	2 0 13.85	16 12 57.4	15.7	15.2	1.05
9	2 52.4	2 3 15.49	16 36 5.0	15.9	15.4	1.07
10	2 51.5	2 6 14.40	16 58 47.3	16.1	15.6	1.09
11	2 50.5	2 9 10.44	17 21 3.5	16.4	15.8	1.10
12	2 49.5	2 12 3.45	+17 42 52.7	16.6	16.0	1.12
13	2 48.4	2 14 53.29	18 4 14.2	16.8	16.2	1.14
14	2 47.2	2 17 39.80	18 25 7.2	17.1	16.4	1.16
15	2 45.9	2 20 22.80	18 45 31.0	17.3	16.6	1.18
16	2 44.6	2 23 2.13	19 5 24.9	17.6	16.8	1.20
17	2 43.3	2 25 37.61	+19 24 48.1	17.8	17.2	1.22
18	2 41.9	2 28 9.04	19 43 39.7	18.1	17.4	1.24
19	2 40.4	2 30 36.24	20 1 58.8	18.3	17.7	1.26
20	2 38.9	2 32 59.00	20 19 44.8	18.6	18.0	1.28
21	2 37.3	2 35 17.12	20 36 56.6	18.9	18.2	1.30
22	2 35.5	2 37 30.37	+20 53 33.4	19.2	18.5	1.32
23	2 33.7	2 39 38.53	21 9 34.0	19.5	18.8	1.34
24	2 31.9	2 41 41.38	21 24 57.7	19.8	19.1	1.37
25	2 30.0	2 43 38.67	21 39 43.3	20.1	19.4	1.39
26	2 27.9	2 45 30.14	21 53 49.8	20.4	19.7	1.42
27	2 25.6	2 47 15.55	+22 7 16.0	20.7	20.0	1.44
28	2 23.3	2 48 54.64	22 20 0.7	21.0	20.3	1.47
29	2 20.9	2 50 27.13	22 32 2.4	21.3	20.6	1.49
30	2 18.4	2 51 52.77	22 43 19.6	21.7	21.0	1.52
31	2 15.8	2 53 11.27	22 53 50.9	22.1	21.3	1.54
32	2 13.0	2 54 22.35	+23 3 34.9	22.4	21.6	1.57
33	2 10.2	2 55 25.74	+23 12 29.8	22.8	22.0	1.60

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Apr. 1	2 13.0	2 54 22.35	+23 3 34.9	22.4	21.6	1.57	May 16	22 20.0	2 2 3.91	+13 35 55.5	27.1	26.2	1.80
2	2 10.2	2 55 25.74	23 12 29.8	22.8	22.0	1.60	17	22 15.8	2 1 42.74	13 20 0.4	26.8	25.8	1.77
3	2 7.2	2 56 21.15	23 20 33.8	23.1	22.3	1.62	18	22 11.7	2 1 30.54	13 5 11.8	26.4	25.5	1.75
4	2 4.0	2 57 8.32	23 27 44.9	23.5	22.7	1.65	19	22 7.7	2 1 27.23	12 51 30.9	26.0	25.1	1.72
5	2 0.7	2 57 47.01	23 34 1.3	23.9	23.0	1.67	20	22 3.8	2 1 32.69	12 38 58.4	25.6	24.7	1.69
6	1 57.2	2 58 16.95	+23 39 20.7	24.2	23.4	1.70	21	22 0.2	2 1 46.77	+12 27 34.2	25.2	24.4	1.66
7	1 53.6	2 58 37.94	23 43 41.0	24.6	23.8	1.73	22	21 56.6	2 2 9.30	12 17 18.3	24.8	24.0	1.63
8	1 49.9	2 58 49.78	23 46 59.9	25.0	24.2	1.76	23	21 53.1	2 2 40.07	12 8 9.9	24.4	23.6	1.61
9	1 46.0	2 58 52.29	23 49 15.4	25.4	24.5	1.78	24	21 49.8	2 3 18.90	12 0 8.1	24.0	23.2	1.59
10	1 42.0	2 58 45.33	23 50 25.0	25.8	24.9	1.81	25	21 46.7	2 4 5.57	11 53 11.8	23.7	22.9	1.56
11	1 37.8	2 58 28.82	+23 50 26.7	26.1	25.2	1.84	26	21 43.7	2 4 59.86	+11 47 19.5	23.3	22.5	1.53
12	1 33.5	2 58 2.72	23 49 18.1	26.5	25.6	1.87	27	21 40.8	2 6 1.53	11 42 29.7	23.0	22.1	1.51
13	1 29.0	2 57 27.04	23 46 57.3	26.9	25.9	1.89	28	21 38.0	2 7 10.35	11 38 40.8	22.6	21.8	1.48
14	1 24.3	2 56 41.80	23 43 22.0	27.2	26.3	1.92	29	21 35.3	2 8 26.09	11 35 51.0	22.2	21.4	1.46
15	1 19.5	2 55 47.12	23 38 30.6	27.6	26.7	1.94	30	21 32.7	2 9 48.52	11 33 58.4	21.8	21.1	1.43
16	1 14.5	2 54 43.21	+23 32 21.3	28.0	27.0	1.96	31	21 30.2	2 11 17.43	+11 33 0.9	21.5	20.7	1.41
17	1 9.3	2 53 30.33	23 24 53.3	28.3	27.3	1.99	June 1	21 27.9	2 12 52.59	11 32 56.6	21.1	20.3	1.38
18	1 4.0	2 52 8.82	23 16 5.3	28.6	27.7	2.01	2	21 25.8	2 14 33.80	11 33 43.4	20.8	20.0	1.36
19	0 58.6	2 50 39.02	23 5 56.8	29.0	28.1	2.02	3	21 23.6	2 16 20.85	11 35 19.4	20.4	19.7	1.34
20	0 53.1	2 49 1.57	22 54 28.2	29.3	28.4	2.04	4	21 21.5	2 18 13.57	11 37 42.8	20.1	19.4	1.32
21	0 47.3	2 47 16.84	+22 41 39.9	29.6	28.6	2.06	5	21 19.5	2 20 11.76	+11 40 51.6	19.8	19.1	1.30
22	0 41.5	2 45 25.51	22 27 33.2	29.8	28.8	2.08	6	21 17.6	2 22 15.22	11 44 43.5	19.5	18.8	1.28
23	0 35.6	2 43 28.25	22 12 9.8	30.0	29.0	2.09	7	21 15.8	2 24 23.81	11 49 16.4	19.2	18.5	1.26
24	0 29.7	2 41 25.79	21 55 32.3	30.2	29.2	2.10	8	21 14.1	2 26 37.35	11 54 28.6	18.9	18.2	1.24
25	0 23.7	2 39 18.92	21 37 43.8	30.4	29.4	2.10	9	21 12.5	2 28 55.68	12 0 18.1	18.6	18.0	1.22
26	0 17.6	2 37 8.48	+21 18 48.0	30.6	29.5	2.11	10	21 10.9	2 31 18.66	+12 6 43.1	18.3	17.7	1.20
27	0 11.5	2 34 55.40	20 58 49.9	30.7	29.6	2.11	11	21 9.4	2 33 46.14	12 13 41.6	18.0	17.4	1.18
28	0 5.3	2 32 40.54	20 37 54.6	30.7	29.7	2.12	12	21 8.0	2 36 17.98	12 21 11.9	17.7	17.2	1.17
28	23 59.1	2 30 24.80	20 16 8.0	30.8	29.7	2.12	13	21 6.6	2 38 54.06	12 29 12.0	17.5	16.9	1.15
29	23 52.9	2 28 9.12	19 53 36.5	30.8	29.8	2.11	14	21 5.3	2 41 34.23	12 37 40.3	17.2	16.6	1.14
30	23 46.8	2 25 54.41	+19 30 27.4	30.9	29.8	2.11	15	21 4.2	2 44 18.38	+12 46 34.8	17.0	16.4	1.12
May 1	23 40.7	2 23 41.57	19 6 48.0	30.9	29.8	2.10	16	21 3.1	2 47 6.39	12 55 53.9	16.8	16.1	1.10
2	23 34.6	2 21 31.46	18 42 45.9	30.8	29.7	2.09	17	21 2.0	2 49 58.15	13 5 35.9	16.5	15.9	1.09
3	23 28.5	2 19 24.92	18 18 29.0	30.7	29.7	2.08	18	21 1.0	2 52 53.54	13 15 39.2	16.3	15.7	1.07
4	23 22.5	2 17 22.76	17 54 5.5	30.6	29.6	2.06	19	21 0.0	2 55 52.46	13 26 1.9	16.0	15.5	1.06
5	23 16.6	2 15 25.72	+17 29 43.4	30.4	29.4	2.05	20	20 59.1	2 58 54.81	+13 36 42.6	15.8	15.3	1.05
6	23 10.8	2 13 34.45	17 5 30.3	30.2	29.1	2.03	21	20 58.2	3 2 0.48	13 47 39.6	15.6	15.1	1.03
7	23 5.1	2 11 49.60	16 41 34.0	30.0	28.9	2.01	22	20 57.4	3 5 9.37	13 58 51.3	15.4	14.9	1.02
8	22 59.6	2 10 11.73	16 18 1.8	29.7	28.7	1.99	23	20 56.6	3 8 21.40	14 10 16.4	15.2	14.7	1.01
9	22 54.1	2 8 41.31	15 55 0.3	29.5	28.5	1.97	24	20 56.0	3 11 36.50	14 21 53.2	15.0	14.5	1.00
10	22 48.8	2 7 18.75	+15 32 36.0	29.2	28.2	1.95	25	20 55.4	3 14 54.56	+14 33 40.3	14.8	14.3	0.98
11	22 43.7	2 6 4.42	15 10 54.8	28.9	27.9	1.93	26	20 54.8	3 18 15.52	14 45 36.2	14.6	14.1	0.97
12	22 38.6	2 4 58.62	14 50 1.9	28.5	27.5	1.90	27	20 54.3	3 21 39.30	14 57 39.5	14.4	13.9	0.96
13	22 33.7	2 4 1.54	14 30 1.9	28.2	27.2	1.88	28	20 53.8	3 25 5.85	15 9 49.0	14.2	13.7	0.95
14	22 28.9	2 3 13.33	14 10 58.7	27.9	26.9	1.85	29	20 53.3	3 28 35.08	15 22 3.4	14.0	13.5	0.94
15	22 24.4	2 2 34.10	+13 52 55.6	27.5	26.6	1.82	30	20 52.9	3 32 6.95	+15 34 21.4	13.9	13.4	0.92
16	22 20.0	2 2 3.91	+13 35 55.5	27.1	26.2	1.80	31	20 52.5	3 35 41.40	+15 46 41.6	13.7	13.2	0.91

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
July 1	20 52.5	3 35 41.40	+15 46 41.6	13.7	13.2	0.91	Aug. 16	21 10.2	6 54 43.88	+21 11 41.0	8.8	8.5	0.61
2	20 52.2	3 39 18.37	15 59 2.8	13.5	13.0	0.90	17	21 11.0	6 59 32.85	21 8 49.5	8.7	8.4	0.60
3	20 51.9	3 42 57.82	16 11 23.8	13.4	12.9	0.90	18	21 11.9	7 4 22.33	21 5 25.2	8.7	8.4	0.60
4	20 51.7	3 46 39.71	16 23 43.5	13.2	12.7	0.89	19	21 12.8	7 9 12.27	21 1 27.8	8.6	8.3	0.60
5	20 51.5	3 50 23.98	16 36 0.8	13.0	12.6	0.88	20	21 13.7	7 14 2.61	20 56 57.3	8.6	8.3	0.59
6	20 51.3	3 54 10.60	+16 48 14.7	12.9	12.4	0.87	21	21 14.6	7 18 53.29	+20 51 53.5	8.5	8.2	0.59
7	20 51.2	3 57 59.52	17 0 23.9	12.7	12.3	0.86	22	21 15.5	7 23 44.27	20 46 16.3	8.4	8.2	0.58
8	20 51.1	4 1 50.71	17 12 27.4	12.6	12.2	0.85	23	21 16.4	7 28 35.50	20 40 5.6	8.4	8.1	0.58
9	20 51.1	4 5 44.14	17 24 24.3	12.5	12.0	0.84	24	21 17.3	7 33 26.90	20 33 21.5	8.3	8.0	0.57
10	20 51.0	4 9 39.77	17 36 13.5	12.3	11.9	0.83	25	21 18.2	7 38 18.45	20 26 4.0	8.3	8.0	0.57
11	20 51.0	4 13 37.57	+17 47 53.9	12.2	11.8	0.82	26	21 19.1	7 43 10.09	+20 18 13.0	8.2	7.9	0.56
12	20 51.1	4 17 37.50	17 59 24.4	12.0	11.6	0.82	27	21 20.0	7 48 1.77	20 9 48.5	8.2	7.9	0.56
13	20 51.1	4 21 39.53	18 10 44.2	11.9	11.5	0.81	28	21 21.0	7 52 53.45	20 0 51.4	8.1	7.8	0.56
14	20 51.2	4 25 43.62	18 21 52.3	11.8	11.4	0.80	29	21 21.9	7 57 45.09	19 51 20.8	8.0	7.8	0.55
15	20 51.4	4 29 49.74	18 32 47.8	11.7	11.2	0.79	30	21 22.8	8 2 36.64	19 41 17.2	8.0	7.7	0.55
16	20 51.6	4 33 57.85	+18 43 29.6	11.5	11.1	0.79	31	21 23.7	8 7 28.07	+19 30 40.7	7.9	7.7	0.55
17	20 51.8	4 38 7.91	18 53 56.9	11.4	11.0	0.78	Sept. 1	21 24.6	8 12 19.33	19 19 31.5	7.9	7.6	0.54
18	20 52.1	4 42 19.88	19 4 8.8	11.3	10.9	0.77	2	21 25.5	8 17 10.40	19 7 49.9	7.9	7.6	0.54
19	20 52.4	4 46 33.72	19 14 4.2	11.2	10.8	0.76	3	21 26.4	8 22 1.23	18 55 36.1	7.8	7.5	0.53
20	20 52.7	4 50 49.39	19 23 42.3	11.1	10.7	0.76	4	21 27.3	8 26 51.81	18 42 50.4	7.8	7.5	0.53
21	20 53.1	4 55 6.84	+19 33 2.4	11.0	10.6	0.75	5	21 28.2	8 31 42.10	+18 29 33.1	7.7	7.4	0.53
22	20 53.5	4 59 26.03	19 42 3.6	10.9	10.5	0.75	6	21 29.1	8 36 32.08	18 15 44.4	7.7	7.4	0.52
23	20 53.9	5 3 46.94	19 50 45.0	10.8	10.4	0.74	7	21 30.0	8 41 21.72	18 1 24.5	7.6	7.4	0.52
24	20 54.3	5 8 9.50	19 59 5.8	10.6	10.3	0.73	8	21 30.9	8 46 10.99	17 46 33.8	7.6	7.3	0.51
25	20 54.8	5 12 33.67	20 7 5.2	10.5	10.2	0.72	9	21 31.7	8 50 59.88	17 31 12.7	7.6	7.3	0.51
26	20 55.3	5 16 59.40	+20 14 42.5	10.4	10.1	0.72	10	21 32.6	8 55 48.36	+17 15 21.5	7.5	7.2	0.51
27	20 55.8	5 21 26.65	20 21 57.0	10.4	10.0	0.71	11	21 33.4	9 0 36.42	16 59 0.6	7.5	7.2	0.50
28	20 56.3	5 25 55.38	20 28 48.0	10.3	9.9	0.71	12	21 34.3	9 5 24.04	16 42 10.4	7.4	7.2	0.50
29	20 56.8	5 30 25.55	20 35 14.8	10.2	9.8	0.70	13	21 35.1	9 10 11.20	16 24 51.3	7.4	7.1	0.50
30	20 57.3	5 34 57.10	20 41 16.6	10.1	9.8	0.70	14	21 36.0	9 14 57.89	16 7 3.7	7.4	7.1	0.49
31	20 57.9	5 39 30.00	+20 46 53.1	10.0	9.7	0.69	15	21 36.8	9 19 44.08	+15 48 48.1	7.3	7.1	0.49
Aug. 1	20 58.5	5 44 4.20	20 52 3.4	9.9	9.6	0.68	16	21 37.6	9 24 29.76	15 30 5.0	7.3	7.0	0.49
2	20 59.2	5 48 39.66	20 56 47.0	9.8	9.5	0.68	17	21 38.4	9 29 14.92	15 10 54.9	7.2	7.0	0.48
3	20 59.9	5 53 16.33	21 1 3.4	9.8	9.4	0.67	18	21 39.2	9 33 59.55	14 51 18.3	7.2	7.0	0.48
4	21 0.6	5 57 54.18	21 4 51.9	9.7	9.4	0.67	19	21 40.0	9 38 43.64	14 31 15.6	7.2	6.9	0.48
5	21 1.3	6 2 33.17	+21 8 12.2	9.6	9.3	0.66	20	21 40.8	9 43 27.19	+14 10 47.5	7.1	6.9	0.48
6	21 2.0	6 7 13.25	21 11 3.6	9.5	9.2	0.66	21	21 41.6	9 48 10.19	13 49 54.4	7.1	6.9	0.47
7	21 2.8	6 11 54.37	21 13 25.7	9.4	9.1	0.65	22	21 42.4	9 52 52.64	13 28 37.0	7.1	6.8	0.47
8	21 3.6	6 16 36.50	21 15 18.2	9.4	9.0	0.65	23	21 43.1	9 57 34.52	13 6 55.7	7.0	6.8	0.46
9	21 4.4	6 21 19.58	21 16 40.4	9.3	9.0	0.64	24	21 43.9	10 2 15.85	12 44 51.3	7.0	6.8	0.46
10	21 5.2	6 26 3.57	+21 17 32.1	9.2	8.9	0.64	25	21 44.6	10 6 56.62	+12 22 24.3	7.0	6.7	0.46
11	21 6.0	6 30 48.42	21 17 52.9	9.1	8.8	0.63	26	21 45.3	10 11 36.84	11 59 35.3	6.9	6.7	0.46
12	21 6.8	6 35 34.08	21 17 42.4	9.1	8.8	0.63	27	21 46.0	10 16 16.51	11 36 24.9	6.9	6.7	0.45
13	21 7.6	6 40 20.51	21 17 0.2	9.0	8.7	0.62	28	21 46.7	10 20 55.65	11 12 53.7	6.9	6.6	0.45
14	21 8.5	6 45 7.65	21 15 46.1	8.9	8.6	0.62	29	21 47.4	10 25 34.26	10 49 2.3	6.9	6.6	0.45
15	21 9.3	6 49 55.46	+21 13 59.8	8.9	8.6	0.61	30	21 48.1	10 30 12.36	+10 24 51.5	6.8	6.6	0.45
16	21 10.2	6 54 43 88	+21 11 41.0	8.8	8.5	0.61	31	21 48.8	10 34 49.96	+10 0 21.7	6.8	6.5	0.44

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Oct. 1	21 48.8	10 34 49.96	+10 0 21.7	6.8	6.5	0.44	Nov. 16	22 18.9	14 6 25.72	−11 10 49.4	5.8	5.6	0.38
2	21 49.5	10 39 27.08	9 35 33.7	6.7	6.5	0.44	17	22 19.7	14 11 12.31	11 37 1.7	5.8	5.6	0.38
3	21 50.1	10 44 3.74	9 10 27.9	6.7	6.5	0.44	18	22 20.6	14 15 59.88	12 2 57.9	5.8	5.6	0.38
4	21 50.8	10 48 39.96	8 45 5.2	6.7	6.5	0.44	19	22 21.5	14 20 48.45	12 28 37.5	5.7	5.5	0.38
5	21 51.4	10 53 15.77	8 19 26.1	6.6	6.4	0.43	20	22 22.4	14 25 38.06	12 53 59.4	5.7	5.5	0.38
6	21 52.0	10 57 51.17	+ 7 53 31.3	6.6	6.4	0.43	21	22 23.3	14 30 28.71	−13 19 3.0	5.7	5.5	0.38
7	21 52.6	11 2 26.21	7 27 21.4	6.6	6.4	0.43	22	22 24.2	14 35 20.43	13 43 47.4	5.7	5.5	0.38
8	21 53.3	11 7 0.90	7 0 57.2	6.6	6.4	0.43	23	22 25.1	14 40 13.23	14 8 11.7	5.7	5.5	0.38
9	21 53.9	11 11 35.27	6 34 19.2	6.5	6.3	0.42	24	22 26.1	14 45 7.14	14 32 15.1	5.7	5.5	0.38
10	21 54.6	11 16 9.35	6 7 28.0	6.5	6.3	0.42	25	22 27.0	14 50 2.16	14 55 56.8	5.7	5.5	0.38
11	21 55.2	11 20 43.16	+ 5 40 24.4	6.5	6.3	0.42	26	22 28.0	14 54 58.31	−15 19 16.1	5.6	5.5	0.38
12	21 55.8	11 25 16.73	5 13 9.0	6.5	6.3	0.42	27	22 29.0	14 59 55.60	15 42 12.2	5.6	5.4	0.38
13	21 56.4	11 29 50.09	4 45 42.5	6.4	6.2	0.42	28	22 30.0	15 4 54.06	16 4 44.2	5.6	5.4	0.38
14	21 57.0	11 34 23.26	4 18 5.6	6.4	6.2	0.41	29	22 31.0	15 9 53.69	16 26 51.3	5.6	5.4	0.38
15	21 57.6	11 38 56.29	3 50 19.2	6.4	6.2	0.41	30	22 32.1	15 14 54.50	16 48 32.6	5.6	5.4	0.38
16	21 58.2	11 43 29.19	+ 3 22 23.7	6.4	6.2	0.41	Dec. 1	22 33.2	15 19 56.50	−17 9 47.6	5.6	5.4	0.38
17	21 58.9	11 48 1.98	2 54 19.9	6.3	6.1	0.41	2	22 34.3	15 24 59.69	17 30 35.4	5.6	5.4	0.38
18	21 59.5	11 52 34.71	2 26 8.4	6.3	6.1	0.41	3	22 35.4	15 30 4.07	17 50 55.2	5.6	5.4	0.38
19	22 0.1	11 57 7.42	1 57 50.1	6.3	6.1	0.41	4	22 36.6	15 35 9.66	18 10 46.3	5.6	5.4	0.38
20	22 0.7	12 1 40.11	1 29 25.8	6.3	6.1	0.40	5	22 37.8	15 40 16.44	18 30 7.8	5.5	5.4	0.38
21	22 1.3	12 6 12.84	+ 1 0 56.1	6.3	6.0	0.40	6	22 39.0	15 45 24.42	−18 48 59.0	5.5	5.3	0.38
22	22 1.9	12 10 45.63	0 32 21.7	6.2	6.0	0.40	7	22 40.2	15 50 33.58	19 7 19.4	5.5	5.3	0.38
23	22 2.5	12 15 18.50	+ 0 3 43.4	6.2	6.0	0.40	8	22 41.4	15 55 43.93	19 25 8.0	5.5	5.3	0.38
24	22 3.1	12 19 51.49	− 0 24 58.2	6.2	6.0	0.40	9	22 42.7	16 0 55.45	19 42 24.1	5.5	5.3	0.38
25	22 3.7	12 24 24.63	0 53 42.2	6.2	5.9	0.40	10	22 44.0	16 6 8.14	19 59 7.2	5.5	5.3	0.38
26	22 4.3	12 28 57.95	− 1 22 27.7	6.2	5.9	0.40	11	22 45.3	16 11 21.97	−20 15 16.6	5.5	5.3	0.38
27	22 4.9	12 33 31.51	1 51 14.2	6.1	5.9	0.40	12	22 46.6	16 16 36.92	20 30 51.4	5.5	5.3	0.38
28	22 5.5	12 38 5.33	2 20 1.0	6.1	5.9	0.39	13	22 47.9	16 21 52.98	20 45 51.1	5.5	5.3	0.38
29	22 6.1	12 42 39.44	2 48 47.1	6.1	5.9	0.39	14	22 49.2	16 27 10.12	21 0 15.0	5.4	5.3	0.38
30	22 6.7	12 47 13.89	3 17 32.0	6.1	5.9	0.39	15	22 50.5	16 32 28.31	21 14 2.4	5.4	5.3	0.38
31	22 7.4	12 51 48.69	− 3 46 14.8	6.1	5.8	0.39	16	22 51.9	16 37 47.51	−21 27 12.7	5.4	5.3	0.38
Nov. 1	22 8.1	12 56 23.90	4 14 54.8	6.0	5.8	0.39	17	22 53.3	16 43 7.68	21 39 45.4	5.4	5.2	0.38
2	22 8.8	13 0 59.55	4 43 31.4	6.0	5.8	0.39	18	22 54.7	16 48 28.81	21 51 39.9	5.4	5.2	0.38
3	22 9.5	13 5 35.67	5 12 3.6	6.0	5.8	0.39	19	22 56.1	16 53 50.84	22 2 55.5	5.4	5.2	0.38
4	22 10.2	13 10 12.32	5 40 30.9	6.0	5.8	0.39	20	22 57.6	16 59 13.73	22 13 31.8	5.4	5.2	0.38
5	22 10.8	13 14 49.52	− 6 8 52.4	6.0	5.8	0.39	21	22 59.0	17 4 37.44	−22 23 28.3	5.4	5.2	0.38
6	22 11.5	13 19 27.32	6 37 7.4	5.9	5.7	0.39	22	23 0.5	17 10 1.92	22 32 44.4	5.4	5.2	0.37
7	22 12.1	13 24 5.75	7 5 15.0	5.9	5.7	0.38	23	23 1.9	17 15 27.11	22 41 19.7	5.4	5.2	0.37
8	22 12.8	13 28 44.84	7 33 14.6	5.9	5.7	0.38	24	23 3.4	17 20 52.97	22 49 13.8	5.4	5.2	0.37
9	22 13.5	13 33 24.65	8 1 5.4	5.9	5.7	0.38	25	23 4.9	17 26 19.44	22 56 26.4	5.4	5.2	0.37
10	22 14.2	13 38 5.19	− 8 28 46.7	5.9	5.7	0.38	26	23 6.4	17 31 46.46	−23 2 57.0	5.4	5.2	0.37
11	22 15.0	13 42 46.50	8 56 17.5	5.9	5.7	0.38	27	23 7.9	17 37 13.99	23 8 45.4	5.4	5.2	0.37
12	22 15.8	13 47 28.61	9 23 37.3	5.8	5.6	0.38	28	23 9.4	17 42 41.96	23 13 51.2	5.3	5.2	0.37
13	22 16.5	13 52 11.55	9 50 45.2	5.8	5.6	0.38	29	23 10.9	17 48 10.32	23 18 14.2	5.3	5.1	0.37
14	22 17.3	13 56 55.37	10 17 40.4	5.8	5.6	0.38	30	23 12.5	17 53 39.01	23 21 54.1	5.3	5.1	0.37
15	22 18.1	14 1 40.08	−10 44 22.0	5.8	5.6	0.38	31	23 14.0	17 59 7.96	−23 24 50.7	5.3	5.1	0.37
16	22 18.9	14 6 25.72	−11 10 49.4	5.8	5.6	0.38	32	23 15.6	18 4 37.13	−23 27 3.9	5.3	5.1	0.37

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Polar Semi-diam.	S.T of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Polar Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Apr. 1	17 48.6	18 32 33.36	−22 56 36.5	1.7	18.5	1.43	May 17	14 47.5	18 32 17.85	−23 0 13.7	2.0	21.2	1.63
2	17 45.0	18 32 50.76	22 56 26.3	1.7	18.5	1.43	18	14 43.3	18 31 59.26	23 0 33.9	2.0	21.3	1.64
3	17 41.4	18 33 7.41	22 56 16.7	1.7	18.6	1.43	19	14 39.0	18 31 39.98	23 0 54.6	2.0	21.3	1.64
4	17 37.7	18 33 23.29	22 56 7.5	1.8	18.6	1.44	20	14 34.7	18 31 20.02	23 1 15.7	2.0	21.4	1.64
5	17 34.0	18 33 38.41	22 55 58.8	1.8	18.7	1.44	21	14 30.5	18 30 59.39	23 1 37.2	2.0	21.4	1.65
6	17 30.3	18 33 52.76	−22 55 50.8	1.8	18.7	1.44	22	14 26.2	18 30 38.09	−23 1 59.1	2.0	21.5	1.65
7	17 26.6	18 34 6.35	22 55 43.3	1.8	18.8	1.45	23	14 21.9	18 30 16.13	23 2 21.4	2.0	21.5	1.65
8	17 22.9	18 34 19.18	22 55 36.4	1.8	18.9	1.45	24	14 17.6	18 29 53.54	23 2 44.0	2.0	21.6	1.66
9	17 19.2	18 34 31.23	22 55 30.1	1.8	19.0	1.46	25	14 13.3	18 29 30.32	23 3 6.9	2.0	21.6	1.66
10	17 15.4	18 34 42.50	22 55 24.5	1.8	19.1	1.46	26	14 8.9	18 29 6.49	23 3 30.1	2.0	21.7	1.67
11	17 11.7	18 34 52.98	−22 55 19.5	1.8	19.1	1.47	27	14 4.6	18 28 42.06	−23 3 53.5	2.0	21.7	1.67
12	17 7.9	18 35 2.68	22 55 15.1	1.8	19.2	1.47	28	14 0.2	18 28 17.05	23 4 17.2	2.0	21.8	1.67
13	17 4.1	18 35 11.60	22 55 11.4	1.8	19.2	1.48	29	13 55.9	18 27 51.48	23 4 41.0	2.0	21.8	1.68
14	17 0.3	18 35 19.72	22 55 8.5	1.8	19.3	1.48	30	13 51.5	18 27 25.36	23 5 5.0	2.1	21.9	1.68
15	16 56.5	18 35 27.05	22 55 6.2	1.8	19.3	1.49	31	13 47.2	18 26 58.70	23 5 29.1	2.1	21.9	1.68
16	16 52.7	18 35 33.58	−22 55 4.6	1.8	19.4	1.50	June 1	13 42.8	18 26 31.54	−23 5 53.4	2.1	21.9	1.69
17	16 48.8	18 35 39.31	22 55 3.7	1.8	19.5	1.50	2	13 38.4	18 26 3.88	23 6 17.7	2.1	22.0	1.69
18	16 45.0	18 35 44.24	22 55 3.6	1.8	19.5	1.51	3	13 34.0	18 25 35.76	23 6 42.2	2.1	22.0	1.70
19	16 41.1	18 35 48.37	22 55 4.1	1.8	19.6	1.51	4	13 29.6	18 25 7.18	23 7 6.6	2.1	22.0	1.70
20	16 37.2	18 35 51.69	22 55 5.4	1.8	19.6	1.52	5	13 25.2	18 24 38.17	23 7 31.0	2.1	22.0	1.70
21	16 33.3	18 35 54.19	−22 55 7.5	1.9	19.7	1.52	6	13 20.8	18 24 8.75	−23 7 55.5	2.1	22.1	1.70
22	16 29.4	18 35 55.88	22 55 10.3	1.9	19.8	1.53	7	13 16.4	18 23 38.93	23 8 19.8	2.1	22.1	1.70
23	16 25.5	18 35 56.76	22 55 13.9	1.9	19.8	1.53	8	13 11.9	18 23 8.73	23 8 44.1	2.1	22.1	1.71
24	16 21.6	18 35 56.82	22 55 18.2	1.9	19.9	1.54	9	13 7.5	18 22 38.17	23 9 8.3	2.1	22.1	1.71
25	16 17.6	18 35 56.06	22 55 23.3	1.9	20.0	1.54	10	13 3.0	18 22 7.28	23 9 32.4	2.1	22.2	1.71
26	16 13.7	18 35 54.48	−22 55 29.1	1.9	20.0	1.55	11	12 58.6	18 21 36.08	−23 9 56.4	2.1	22.2	1.71
27	16 9.7	18 35 52.09	22 55 35.6	1.9	20.1	1.55	12	12 54.1	18 21 4.59	23 10 20.2	2.1	22.2	1.71
28	16 5.7	18 35 48.88	22 55 42.9	1.9	20.1	1.56	13	12 49.7	18 20 32.82	23 10 43.7	2.1	22.2	1.71
29	16 1.7	18 35 44.85	22 55 51.0	1.9	20.2	1.56	14	12 45.2	18 20 0.79	23 11 7.0	2.1	22.2	1.71
30	15 57.7	18 35 40.01	22 55 59.8	1.9	20.2	1.57	15	12 40.7	18 19 28.53	23 11 30.1	2.1	22.2	1.71
May 1	15 53.7	18 35 34.36	−22 56 9.4	1.9	20.3	1.57	16	12 36.3	18 18 56.06	−23 11 53.0	2.1	22.3	1.72
2	15 49.7	18 35 27.91	22 56 19.6	1.9	20.3	1.58	17	12 31.8	18 18 23.40	23 12 15.5	2.1	22.3	1.72
3	15 45.6	18 35 20.65	22 56 30.6	1.9	20.4	1.58	18	12 27.3	18 17 50.58	23 12 37.7	2.1	22.3	1.72
4	15 41.5	18 35 12.60	22 56 42.3	1.9	20.4	1.59	19	12 22.8	18 17 17.61	23 12 59.7	2.1	22.3	1.72
5	15 37.4	18 35 3.74	22 56 54.7	1.9	20.5	1.59	20	12 18.3	18 16 44.53	23 13 21.3	2.1	22.3	1.72
6	15 33.4	18 34 54.10	−22 57 7.8	1.9	20.5	1.60	21	12 13.9	18 16 11.34	−23 13 42.5	2.1	22.3	1.72
7	15 29.3	18 34 43.68	22 57 21.6	1.9	20.6	1.60	22	12 9.4	18 15 38.07	23 14 3.4	2.1	22.3	1.72
8	15 25.1	18 34 32.48	22 57 36.1	1.9	20.7	1.60	23	12 4.9	18 15 4.74	23 14 23.9	2.1	22.3	1.72
9	15 21.0	18 34 20.51	22 57 51.2	2.0	20.7	1.61	24	12 0.4	18 14 31.39	23 14 44.0	2.1	22.3	1.73
10	15 16.9	18 34 7.78	22 58 6.9	2.0	20.8	1.61	25	11 55.9	18 13 58.04	23 15 3.7	2.1	22.3	1.73
11	15 12.7	18 33 54.29	−22 58 23.3	2.0	20.9	1.61	26	11 51.4	18 13 24.72	−23 15 23.0	2.1	22.3	1.73
12	15 8.5	18 33 40.05	22 58 40.3	2.0	20.9	1.61	27	11 46.9	18 12 51.44	23 15 41.9	2.1	22.3	1.73
13	15 4.4	18 33 25.07	22 58 57.9	2.0	21.0	1.62	28	11 42.4	18 12 18.23	23 16 0.3	2.1	22.3	1.73
14	15 0.2	18 33 9.35	22 59 16.0	2.0	21.0	1.62	29	11 37.9	18 11 45.11	23 16 18.3	2.1	22.3	1.73
15	14 56.0	18 32 52.90	22 59 34.7	2.0	21.1	1.62	30	11 33.5	18 11 12.11	23 16 35.9	2.1	22.3	1.73
16	14 51.7	18 32 35.73	−22 59 54.0	2.0	21.1	1.63	July 1	11 29.0	18 10 39.25	−23 16 53.1	2.1	22.3	1.73
17	14 47.5	18 32 17.85	−23 0 13.7	2.0	21.2	1.63	2	11 24.5	18 10 6.57	−23 17 9.8	2.1	22.3	1.73

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Polar Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Polar Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
July 1	11 29.0	18 10 39.25	−23 16 53.1	2.1	22.3	1.73	Aug. 16	8 11.2	17 53 37.61	−23 24 23.5	1.9	20.7	1.60
2	11 24.5	18 10 6.57	23 17 9.8	2.1	22.3	1.73	17	8 7.1	17 53 31.33	23 24 30.7	1.9	20.6	1.59
3	11 20.0	18 9 34.09	23 17 26.1	2.1	22.3	1.72	18	8 3.1	17 53 25.86	23 24 37.9	1.9	20.6	1.59
4	11 15.6	18 9 1.81	23 17 41.9	2.1	22.3	1.72	19	7 59.1	17 53 21.20	23 24 45.2	1.9	20.5	1.58
5	11 11.1	18 8 29.78	23 17 57.3	2.1	22.3	1.72	20	7 55.1	17 53 17.36	23 24 52.5	1.9	20.4	1.58
6	11 6.7	18 7 58.00	−23 18 12.3	2.1	22.3	1.72	21	7 51.1	17 53 14.33	−23 25 0.0	1.9	20.4	1.57
7	11 2.2	18 7 26.50	23 18 26.9	2.1	22.2	1.72	22	7 47.2	17 53 12.13	23 25 7.5	1.9	20.3	1.57
8	10 57.8	18 6 55.30	23 18 41.1	2.1	22.2	1.72	23	7 43.2	17 53 10.74	23 25 15.1	1.9	20.2	1.56
9	10 53.3	18 6 24.43	23 18 54.8	2.1	22.2	1.72	24	7 39.3	17 53 10.17	23 25 22.9	1.9	20.2	1.56
10	10 48.9	18 5 53.90	23 19 8.1	2.1	22.2	1.71	25	7 35.3	17 53 10.42	23 25 30.7	1.9	20.1	1.55
11	10 44.4	18 5 23.74	−23 19 21.0	2.1	22.2	1.71	26	7 31.4	17 53 11.50	−23 25 38.6	1.9	20.1	1.55
12	10 40.0	18 4 53.95	23 19 33.5	2.1	22.1	1.71	27	7 27.5	17 53 13.41	23 25 46.6	1.9	20.0	1.54
13	10 35.6	18 4 24.56	23 19 45.6	2.1	22.1	1.71	28	7 23.6	17 53 16.15	23 25 54.7	1.9	19.9	1.54
14	10 31.2	18 3 55.60	23 19 57.3	2.1	22.1	1.71	29	7 19.8	17 53 19.72	23 26 2.9	1.9	19.9	1.53
15	10 26.8	18 3 27.06	23 20 8.7	2.1	22.1	1.71	30	7 15.9	17 53 24.11	23 26 11.1	1.9	19.8	1.53
16	10 22.4	18 2 58.98	−23 20 19.7	2.1	22.0	1.70	31	7 12.0	17 53 29.32	−23 26 19.5	1.9	19.7	1.53
17	10 18.0	18 2 31.37	23 20 30.4	2.1	22.0	1.70	Sept. 1	7 8.2	17 53 35.34	23 26 27.9	1.9	19.7	1.52
18	10 13.6	18 2 4.26	23 20 40.7	2.1	22.0	1.70	2	7 4.4	17 53 42.17	23 26 36.4	1.9	19.6	1.52
19	10 9.2	18 1 37.67	23 20 50.7	2.1	21.9	1.70	3	7 0.6	17 53 49.81	23 26 45.0	1.9	19.6	1.51
20	10 4.9	18 1 11.60	23 21 0.5	2.1	21.9	1.69	4	6 56.8	17 53 58.26	23 26 53.6	1.8	19.5	1.51
21	10 0.5	18 0 46.07	−23 21 9.9	2.1	21.9	1.69	5	6 53.0	17 54 7.52	−23 27 2.3	1.8	19.5	1.50
22	9 56.2	18 0 21.10	23 21 19.0	2.1	21.8	1.69	6	6 49.3	17 54 17.58	23 27 10.9	1.8	19.4	1.50
23	9 51.8	17 59 56.72	23 21 27.9	2.0	21.8	1.69	7	6 45.5	17 54 28.42	23 27 19.5	1.8	19.4	1.49
24	9 47.5	17 59 32.91	23 21 36.5	2.0	21.8	1.68	8	6 41.8	17 54 40.06	23 27 28.2	1.8	19.3	1.49
25	9 43.2	17 59 9.71	23 21 44.9	2.0	21.7	1.68	9	6 38.1	17 54 52.48	23 27 36.9	1.8	19.3	1.48
26	9 38.9	17 58 47.15	−23 21 53.1	2.0	21.7	1.68	10	6 34.3	17 55 5.69	−23 27 45.5	1.8	19.2	1.48
27	9 34.6	17 58 25.22	23 22 1.1	2.0	21.7	1.67	11	6 30.6	17 55 19.67	23 27 54.2	1.8	19.1	1.47
28	9 30.3	17 58 3.94	23 22 8.9	2.0	21.6	1.67	12	6 26.9	17 55 34.42	23 28 2.8	1.8	19.1	1.47
29	9 26.0	17 57 43.33	23 22 16.6	2.0	21.6	1.66	13	6 23.3	17 55 49.94	23 28 11.3	1.8	19.0	1.47
30	9 21.8	17 57 23.41	23 22 24.1	2.0	21.5	1.66	14	6 19.6	17 56 6.22	23 28 19.8	1.8	18.9	1.46
31	9 17.5	17 57 4.18	−23 22 31.5	2.0	21.5	1.66	15	6 15.9	17 56 23.25	−23 28 28.1	1.8	18.9	1.46
Aug. 1	9 13.2	17 56 45.65	23 22 38.7	2.0	21.4	1.65	16	6 12.3	17 56 41.04	23 28 36.4	1.8	18.8	1.45
2	9 9.0	17 56 27.84	23 22 45.9	2.0	21.4	1.65	17	6 8.7	17 56 59.60	23 28 44.5	1.8	18.7	1.45
3	9 4.8	17 56 10.75	23 22 53.0	2.0	21.3	1.64	18	6 5.1	17 57 18.90	23 28 52.5	1.8	18.7	1.44
4	9 0.6	17 55 54.39	23 23 0.1	2.0	21.3	1.64	19	6 1.5	17 57 38.95	23 29 0.4	1.8	18.6	1.44
5	8 56.4	17 55 38.77	−23 23 7.0	2.0	21.2	1.64	20	5 57.9	17 57 59.74	−23 29 8.1	1.7	18.5	1.44
6	8 52.2	17 55 23.89	23 23 14.0	2.0	21.2	1.63	21	5 54.3	17 58 21.27	23 29 15.6	1.7	18.5	1.43
7	8 48.1	17 55 9.78	23 23 20.9	2.0	21.1	1.63	22	5 50.8	17 58 43.52	23 29 23.0	1.7	18.4	1.43
8	8 43.9	17 54 56.42	23 23 27.8	2.0	21.1	1.63	23	5 47.2	17 59 6.49	23 29 30.1	1.7	18.3	1.42
9	8 39.8	17 54 43.84	23 23 34.7	2.0	21.0	1.62	24	5 43.7	17 59 30.18	28 29 37.0	1.7	18.3	1.42
10	8 35.7	17 54 32.02	−23 23 41.6	2.0	21.0	1.62	25	5 40.1	17 59 54.57	−23 29 43.6	1.7	18.2	1.42
11	8 31.5	17 54 20.99	23 23 48.5	2.0	20.9	1.61	26	5 36.6	18 0 19.67	23 29 49.9	1.7	18.2	1.41
12	8 27.4	17 54 10.73	23 23 55.4	2.0	20.9	1.61	27	5 33.1	18 0 45.46	23 29 55.9	1.7	18.1	1.41
13	8 23.4	17 54 1.25	23 24 2.4	1.9	20.8	1.61	28	5 29.6	18 1 11.95	23 30 1.7	1.7	18.1	1.40
14	8 19.3	17 53 52.57	23 24 9.4	1.9	20.8	1.60	29	5 26.2	18 1 39.12	23 30 7.1	1.7	18.0	1.40
15	8 15.2	17 53 44.69	−23 24 16.4	1.9	20.7	1.60	30	5 22.7	18 2 6.98	−23 30 12.1	1.7	18.0	1.39
16	8 11.2	17 53 37.61	−23 24 23.5	1.9	20.7	1.60	Oct. 1	5 19.2	18 2 35.50	−23 30 16.8	1.7	18.0	1.39

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Polar Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Polar Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Jan. 1	14 40.1	9 28 41.77	+16 1 16.5	1.1	9.4	0.69	Feb. 15	11 30.1	9 15 30.37	+17 8 26.4	1.1	9.5	0.71
2	14 36.0	9 28 28.62	16 2 30.2	1.1	9.4	0.69	16	11 25.8	9 15 11.66	17 9 54.9	1.1	9.5	0.71
3	14 31.8	9 28 15.13	16 3 45.3	1.1	9.4	0.70	17	11 21.6	9 14 53.07	17 11 22.6	1.1	9.5	0.71
4	14 27.7	9 28 1.32	16 5 1.8	1.1	9.4	0.70	18	11 17.3	9 14 34.60	17 12 49.4	1.1	9.5	0.71
5	14 23.5	9 27 47.20	16 6 19.6	1.1	9.4	0.70	19	11 13.1	9 14 16.27	17 14 15.3	1.1	9.5	0.71
6	14 19.4	9 27 32.77	+16 7 38.6	1.1	9.4	0.70	20	11 8.9	9 13 58.09	+17 15 40.3	1.1	9.5	0.71
7	14 15.2	9 27 18.04	16 8 58.9	1.1	9.4	0.70	21	11 4.6	9 13 40.07	17 17 4.3	1.1	9.5	0.71
8	14 11.0	9 27 3.03	16 10 20.4	1.1	9.4	0.70	22	11 0.4	9 13 22.22	17 18 27.2	1.1	9.5	0.71
9	14 6.8	9 26 47.73	16 11 43.0	1.1	9.4	0.70	23	10 56.2	9 13 4.55	17 19 49.1	1.1	9.5	0.71
10	14 2.6	9 26 32.16	16 13 6.8	1.1	9.4	0.70	24	10 52.0	9 12 47.07	17 21 9.8	1.1	9.5	0.71
11	13 58.4	9 26 16.33	+16 14 31.6	1.1	9.4	0.70	25	10 47.7	9 12 29.79	+17 22 29.4	1.1	9.5	0.71
12	13 54.2	9 26 0.24	16 15 57.4	1.1	9.5	0.70	26	10 43.5	9 12 12.71	17 23 47.7	1.1	9.5	0.71
13	13 50.0	9 25 43.90	16 17 24.1	1.1	9.5	0.70	27	10 39.3	9 11 55.86	17 25 4.9	1.1	9.5	0.71
14	13 45.8	9 25 27.33	16 18 51.7	1.1	9.5	0.70	28	10 35.1	9 11 39.23	17 26 20.8	1.1	9.5	0.71
15	13 41.6	9 25 10.53	16 20 20.2	1.1	9.5	0.70	Mar. 1	10 30.9	9 11 22.83	17 27 35.3	1.1	9.5	0.71
16	13 37.4	9 24 53.51	+16 21 49.5	1.1	9.5	0.71	2	10 26.7	9 11 6.69	+17 28 48.6	1.1	9.4	0.71
17	13 33.2	9 24 36.27	16 23 19.6	1.1	9.5	0.71	3	10 22.5	9 10 50.80	17 30 0.5	1.1	9.4	0.71
18	13 28.9	9 24 18.83	16 24 50.3	1.1	9.5	0.71	4	10 18.3	9 10 35.19	17 31 11.0	1.1	9.4	0.71
19	13 24.7	9 24 1.20	16 26 21.8	1.1	9.5	0.71	5	10 14.1	9 10 19.85	17 32 20.0	1.1	9.4	0.70
20	13 20.5	9 23 43.39	16 27 53.8	1.1	9.5	0.71	6	10 9.9	9 10 4.80	17 33 27.5	1.1	9.4	0.70
21	13 16.2	9 23 25.40	+16 29 26.4	1.1	9.5	0.71	7	10 5.7	9 9 50.03	+17 34 33.6	1.1	9.4	0.70
22	13 12.0	9 23 7.25	16 30 59.5	1.1	9.5	0.71	8	10 1.6	9 9 35.56	17 35 38.2	1.1	9.4	0.70
23	13 7.8	9 22 48.94	16 32 33.0	1.1	9.5	0.71	9	9 57.4	9 9 21.39	17 36 41.2	1.1	9.4	0.70
24	13 3.5	9 22 30.48	16 34 6.9	1.1	9.5	0.71	10	9 53.2	9 9 7.54	17 37 42.6	1.1	9.4	0.70
25	12 59.3	9 22 11.89	16 35 41.2	1.1	9.5	0.71	11	9 49.1	9 8 54.00	17 38 42.5	1.1	9.4	0.70
26	12 55.1	9 21 53.18	+16 37 15.8	1.1	9.5	0.71	12	9 44.9	9 8 40.79	+17 39 40.7	1.1	9.4	0.70
27	12 50.8	9 21 34.35	16 38 50.6	1.1	9.5	0.71	13	9 40.8	9 8 27.92	17 40 37.3	1.1	9.3	0.70
28	12 46.6	9 21 15.42	16 40 25.6	1.1	9.6	0.71	14	9 36.6	9 8 15.38	17 41 32.2	1.1	9.3	0.70
29	12 42.3	9 20 56.41	16 42 0.8	1.1	9.6	0.71	15	9 32.5	9 8 3.18	17 42 25.5	1.1	9.3	0.70
30	12 38.1	9 20 37.31	16 43 36.0	1.1	9.6	0.71	16	9 28.4	9 7 51.34	17 43 17.1	1.1	9.3	0.70
31	12 33.8	9 20 18.15	+16 45 11.3	1.1	9.6	0.71	17	9 24.3	9 7 39.85	+17 44 6.9	1.0	9.3	0.70
Feb. 1	12 29.6	9 19 58.93	16 46 46.5	1.1	9.6	0.71	18	9 20.1	9 7 28.72	17 44 55.1	1.0	9.3	0.70
2	12 25.3	9 19 39.66	16 48 21.6	1.1	9.6	0.71	19	9 16.0	9 7 17.95	17 45 41.5	1.0	9.3	0.70
3	12 21.1	9 19 20.37	16 49 56.7	1.1	9.6	0.71	20	9 11.9	9 7 7.55	17 46 26.1	1.0	9.3	0.70
4	12 16.8	9 19 1.05	16 51 31.5	1.1	9.6	0.71	21	9 7.8	9 6 57.52	17 47 8.9	1.0	9.2	0.69
5	12 12.6	9 18 41.72	+16 53 6.0	1.1	9.6	0.71	22	9 3.8	9 6 47.88	+17 47 50.0	1.0	9.2	0.69
6	12 8.3	9 18 22.39	16 54 40.3	1.1	9.6	0.71	23	8 59.7	9 6 38.62	17 48 29.3	1.0	9.2	0.69
7	12 4.0	9 18 3.08	16 56 14.2	1.1	9.6	0.71	24	8 55.6	9 6 29.74	17 49 6.8	1.0	9.2	0.69
8	11 59.8	9 17 43.79	16 57 47.6	1.1	9.6	0.71	25	8 51.5	9 6 21.26	17 49 42.4	1.0	9.2	0.69
9	11 55.6	9 17 24.54	16 59 20.6	1.1	9.6	0.71	26	8 47.5	9 6 13.18	17 50 16.2	1.0	9.2	0.69
10	11 51.3	9 17 5.33	+17 0 53.1	1.1	9.6	0.71	27	8 43.4	9 6 5.50	+17 50 48.2	1.0	9.2	0.69
11	11 47.1	9 16 46.18	17 2 25.1	1.1	9.6	0.71	28	8 39.3	9 5 58.23	17 51 18.4	1.0	9.1	0.69
12	11 42.8	9 16 27.10	17 3 56.4	1.1	9.6	0.71	29	8 35.3	9 5 51.37	17 51 46.6	1.0	9.1	0.68
13	11 38.6	9 16 8.10	17 5 27.1	1.1	9.5	0.71	30	8 31.3	9 5 44.93	17 52 13.0	1.0	9.1	0.68
14	11 34.3	9 15 49.18	17 6 57.1	1.1	9.5	0.71	31	8 27.2	9 5 38.89	17 52 37.6	1.0	9.1	0.68
15	11 30.1	9 15 30.37	+17 8 26.4	1.1	9.5	0.71	Apr. 1	8 23.2	9 5 33.28	+17 53 0.2	1.0	9.1	0.68
16	11 25.8	9 15 11.66	+17 9 54.9	1.1	9.5	0.71	2	8 19.2	9 5 28.09	+17 53 21.0	1.0	9.1	0.68

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Polar Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Polar Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Apr. 1	8 23.2	9 5 33.28	+17 53 0.2	1.0	9.1	0.68	Nov. 16	18 35.9	10 22 48.11	+11 37 17.1	1.0	8.4	0.61
2	8 19.2	9 5 28.09	17 53 21.0	1.0	9.1	0.68	17	18 32.1	10 22 59.31	11 36 27.5	1.0	8.4	0.61
3	8 15.2	9 5 23.33	17 53 39.8	1.0	9.0	0.68	18	18 28.4	10 23 10.14	11 35 40.2	1.0	8.4	0.61
4	8 11.2	9 5 18.99	17 53 56.7	1.0	9.0	0.68	19	18 24.6	10 23 20.58	11 34 55.1	1.0	8.4	0.61
5	8 7.2	9 5 15.08	17 54 11.7	1.0	9.0	0.68	20	18 20.9	10 23 30.63	11 34 12.2	1.0	8.4	0.61
6	8 3.2	9 5 11.60	+17 54 24.8	1.0	9.0	0.67	21	18 17.1	10 23 40.28	+11 33 31.7	1.0	8.4	0.61
7	7 59.2	9 5 8.55	17 54 36.0	1.0	9.0	0.67	22	18 13.3	10 23 49.54	11 32 53.5	1.0	8.5	0.61
8	7 55.2	9 5 5.93	17 54 45.2	1.0	9.0	0.67	23	18 9.5	10 23 58.40	11 32 17.5	1.0	8.5	0.61
9	7 51.3	9 5 3.74	17 54 52.6	1.0	8.9	0.67	24	18 5.8	10 24 6.86	11 31 44.0	1.0	8.5	0.62
10	7 47.3	9 5 1.99	17 54 58.1	1.0	8.9	0.67	25	18 2.0	10 24 14.91	11 31 12.8	1.0	8.5	0.62
11	7 43.3	9 5 0.66	+17 55 1.7	1.0	8.9	0.67	26	17 58.2	10 24 22.57	+11 30 43.9	1.0	8.5	0.62
12	7 39.4	9 4 59.77	17 55 3.4	1.0	8.9	0.67	27	17 54.3	10 24 29.81	11 30 17.4	1.0	8.5	0.62
13	7 35.4	9 4 59.31	17 55 3.1	1.0	8.9	0.67	28	17 50.5	10 24 36.65	11 29 53.3	1.0	8.6	0.62
14	7 31.5	9 4 59.29	17 55 1.0	1.0	8.9	0.66	29	17 46.7	10 24 43.08	11 29 31.6	1.0	8.6	0.62
15	7 27.6	9 4 59.69	17 54 57.0	1.0	8.8	0.66	30	17 42.9	10 24 49.10	11 29 12.3	1.0	8.6	0.62
16	7 23.7	9 5 0.52	+17 54 51.1	1.0	8.8	0.66	Dec. 1	17 39.0	10 24 54.70	+11 28 55.4	1.0	8.6	0.62
17	7 19.8	9 5 1.78	17 54 43.3	1.0	8.8	0.66	2	17 35.2	10 24 59.89	11 28 40.8	1.0	8.6	0.63
18	7 15.9	9 5 3.48	17 54 33.7	1.0	8.8	0.66	3	17 31.3	10 25 4.67	11 28 28.7	1.0	8.6	0.63
19	7 12.0	9 5 5.59	17 54 22.2	1.0	8.8	0.66	4	17 27.5	10 25 9.03	11 28 19.0	1.0	8.7	0.63
20	7 8.1	9 5 8.15	17 54 8.8	1.0	8.8	0.66	5	17 23.6	10 25 12.98	11 28 11.7	1.0	8.7	0.63
21	7 4.2	9 5 11.13	+17 53 53.6	1.0	8.8	0.66	6	17 19.8	10 25 16.50	+11 28 6.9	1.0	8.7	0.63
22	7 0.3	9 5 14.53	17 53 36.5	1.0	8.7	0.65	7	17 15.9	10 25 19.61	11 28 4.5	1.0	8.7	0.63
23	6 56.5	9 5 18.37	17 53 17.6	1.0	8.7	0.65	8	17 12.0	10 25 22.30	11 28 4.5	1.0	8.7	0.63
24	6 52.6	9 5 22.63	17 52 56.7	1.0	8.7	0.65	9	17 8.1	10 25 24.57	11 28 6.9	1.0	8.7	0.63
25	6 48.7	9 5 27.32	17 52 34.0	1.0	8.7	0.65	10	17 4.2	10 25 26.42	11 28 11.8	1.0	8.7	0.64
26	6 44.9	9 5 32.44	+17 52 9.5	1.0	8.7	0.65	11	17 0.3	10 25 27.85	+11 28 19.0	1.0	8.8	0.64
27	6 41.0	9 5 37.97	17 51 43.2	1.0	8.7	0.65	12	16 56.4	10 25 28.85	11 28 28.7	1.0	8.8	0.64
28	6 37.2	9 5 43.93	17 51 15.0	1.0	8.7	0.65	13	16 52.4	10 25 29.43	11 28 40.9	1.0	8.8	0.64
29	6 33.4	9 5 50.31	17 50 45.0	1.0	8.6	0.65	14	16 48.5	10 25 29.58	11 28 55.5	1.0	8.8	0.64
30	6 29.6	9 5 57.11	17 50 13.2	1.0	8.6	0.64	15	16 44.6	10 25 29.32	11 29 12.5	1.0	8.8	0.64
May 1	6 25.7	9 6 4.32	+17 49 39.6	1.0	8.6	0.64	16	16 40.6	10 25 28.62	+11 29 31.9	1.0	8.8	0.64
2	6 22.0	9 6 11.95	17 49 4.2	1.0	8.6	0.64	17	16 36.7	10 25 27.50	11 29 53.8	1.0	8.9	0.64
3	6 18.2	9 6 19.99	17 48 27.0	1.0	8.6	0.64	18	16 32.7	10 25 25.96	11 30 18.0	1.0	8.9	0.65
4	6 14.4	9 6 28.44	17 47 48.1	1.0	8.6	0.64	19	16 28.7	10 25 24.00	11 30 44.8	1.0	8.9	0.65
5	6 10.6	9 6 37.29	17 47 7.4	1.0	8.5	0.64	20	16 24.8	10 25 21.61	11 31 13.8	1.0	8.9	0.65
6	6 6.8	9 6 46.54	+17 46 24.9	1.0	8.5	0.64	21	16 20.8	10 25 18.80	+11 31 45.2	1.0	8.9	0.65
7	6 3.0	9 6 56.20	17 45 40.6	1.0	8.5	0.64	22	16 16.8	10 25 15.57	11 32 19.0	1.0	8.9	0.65
8	5 59.3	9 7 6.25	17 44 54.6	1.0	8.5	0.63	23	16 12.8	10 25 11.92	11 32 55.2	1.0	8.9	0.65
9	5 55.5	9 7 16.70	17 44 6.9	1.0	8.5	0.63	24	16 8.8	10 25 7.86	11 33 33.7	1.0	9.0	0.65
10	5 51.8	9 7 27.53	17 43 17.5	1.0	8.5	0.63	25	16 4.8	10 25 3.39	11 34 14.5	1.0	9.0	0.65
11	5 48.0	9 7 38.75	+17 42 26.4	1.0	8.5	0.63	26	16 0.8	10 24 58.51	+11 34 57.6	1.0	9.0	0.66
12	5 44.3	9 7 50.35	17 41 33.6	1.0	8.4	0.63	27	15 56.8	10 24 53.22	11 35 43.0	1.0	9.0	0.66
13	5 40.6	9 8 2.33	17 40 39.1	1.0	8.4	0.63	28	15 52.8	10 24 47.53	11 36 30.7	1.0	9.0	0.66
14	5 36.8	9 8 14.68	17 39 43.0	1.0	8.4	0.63	29	15 48.7	10 24 41.43	11 37 20.6	1.0	9.0	0.66
15	5 33.1	9 8 27.41	17 38 45.3	0.9	8.4	0.63	30	15 44.7	10 24 34.94	11 38 12.6	1.0	9.0	0.66
16	5 29.4	9 8 40.51	+17 37 45.9	0.9	8.4	0.62	31	15 40.6	10 24 28.05	+11 39 6.8	1.0	9.1	0.66
17	5 25.7	9 8 53.96	+17 36 44.9	0.9	8.4	0.62	32	15 36.6	10 24 20.77	+11 40 3.2	1.0	9.1	0.66

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
Jan. 1	18 32.1	13 21 18.08	−7 53 37.6	0.5	1.8	0.12
2	18 28.2	13 21 22.88	7 54 4.4	0.5	1.8	0.12
3	18 24.4	13 21 27.47	7 54 30.0	0.5	1.8	0.12
4	18 20.5	13 21 31.86	7 54 54.4	0.5	1.8	0.12
5	18 16.7	13 21 36.04	7 55 17.5	0.5	1.8	0.12
6	18 12.8	13 21 40.02	−7 55 39.4	0.5	1.8	0.12
7	18 8.9	13 21 43.80	7 56 0.1	0.5	1.8	0.12
8	18 5.1	13 21 47.37	7 56 19.5	0.5	1.8	0.12
9	18 1.2	13 21 50.73	7 56 37.7	0.5	1.8	0.12
10	17 57.3	13 21 53.88	7 56 54.6	0.5	1.8	0.12
11	17 53.4	13 21 56.83	−7 57 10.3	0.5	1.8	0.12
12	17 49.5	13 21 59.58	7 57 24.7	0.5	1.8	0.12
13	17 45.6	13 22 2.11	7 57 37.9	0.5	1.8	0.12
14	17 41.7	13 22 4.43	7 57 49.9	0.5	1.8	0.12
15	17 37.8	13 22 6.55	7 58 0.6	0.5	1.8	0.12
16	17 33.9	13 22 8.46	−7 58 10.1	0.5	1.8	0.12
17	17 30.0	13 22 10.15	7 58 18.3	0.5	1.8	0.12
18	17 26.1	13 22 11.64	7 58 25.3	0.5	1.8	0.12
19	17 22.2	13 22 12.92	7 58 31.0	0.5	1.8	0.12
20	17 18.3	13 22 13.99	7 58 35.5	0.5	1.8	0.12
21	17 14.4	13 22 14.85	−7 58 38.7	0.5	1.8	0.12
22	17 10.5	13 22 15.50	7 58 40.7	0.5	1.8	0.12
23	17 6.5	13 22 15.94	7 58 41.5	0.5	1.8	0.12
24	17 2.6	13 22 16.17	7 58 40.9	0.5	1.6	0.12
25	16 58.7	13 22 16.19	7 58 39.2	0.5	1.8	0.12
26	16 54.8	13 22 16.00	−7 58 36.2	0.5	1.8	0.12
27	16 50.8	13 22 15.60	7 58 31.9	0.5	1.9	0.12
28	16 46.9	13 22 14.99	7 58 26.4	0.5	1.9	0.12
29	16 42.9	13 22 14.17	7 58 19.7	0.5	1.9	0.12
30	16 39.0	13 22 13.14	7 58 11.8	0.5	1.9	0.12
31	16 35.0	13 22 11.91	−7 58 2.6	0.5	1.9	0.13
Feb. 1	16 31.1	13 22 10.47	7 57 52.2	0.5	1.9	0.13
2	16 27.1	13 22 8.83	7 57 40.6	0.5	1.9	0.13
3	16 23.2	13 22 6.98	7 57 27.8	0.5	1.9	0.13
4	16 19.2	13 22 4.92	7 57 13.7	0.5	1.9	0.13
5	16 15.2	13 22 2.67	−7 56 58.5	0.5	1.9	0.13
6	16 11.2	13 22 0.22	7 56 42.2	0.5	1.9	0.13
7	16 7.3	13 21 57.57	7 56 24.6	0.5	1.9	0.13
8	16 3.3	13 21 54.72	7 56 5.9	0.5	1.9	0.13
9	15 59.3	13 21 51.68	7 55 46.0	0.5	1.9	0.13
10	15 55.3	13 21 48.44	−7 55 25.0	0.5	1.9	0.13
11	15 51.3	13 21 45.01	7 55 2.9	0.5	1.9	0.13
12	15 47.3	13 21 41.39	7 54 39.6	0.5	1.9	0.13
13	15 43.3	13 21 37.59	7 54 15.3	0.5	1.9	0.13
14	15 39.3	13 21 33.60	7 53 49.8	0.5	1.9	0.13
15	15 35.3	13 21 29.42	−7 53 23.3	0.5	1.9	0.13
16	15 31.3	13 21 25.06	−7 52 55.7	0.5	1.9	0.13
Feb. 15	15 35.3	13 21 29.42	−7 53 23.3	0.5	1.9	0.13
16	15 31.3	13 21 25.06	7 52 55.7	0.5	1.9	0.13
17	15 27.3	13 21 20.52	7 52 27.0	0.5	1.9	0.13
18	15 23.3	13 21 15.80	7 51 57.3	0.5	1.9	0.13
19	15 19.3	13 21 10.91	7 51 26.6	0.5	1.9	0.13
20	15 15.3	13 21 5.84	−7 50 54.8	0.5	1.9	0.13
21	15 11.3	13 21 0.59	7 50 22.0	0.5	1.9	0.13
22	15 7.3	13 20 55.18	7 49 48.2	0.5	1.9	0.13
23	15 3.2	13 20 49.60	7 49 13.5	0.5	1.9	0.13
24	14 59.2	13 20 43.85	7 48 37.7	0.5	1.9	0.13
25	14 55.2	13 20 37.94	−7 48 1.1	0.5	1.9	0.13
26	14 51.1	13 20 31.87	7 47 23.5	0.5	1.9	0.13
27	14 47.1	13 20 25.64	7 46 44.9	0.5	1.9	0.13
28	14 43.1	13 20 19.25	7 46 5.5	0.5	1.9	0.13
Mar. 1	14 39.0	13 20 12.72	7 45 25.1	0.5	1.9	0.13
2	14 35.0	13 20 6.03	−7 44 43.9	0.5	1.9	0.13
3	14 31.0	13 19 59.20	7 44 1.8	0.5	1.9	0.13
4	14 26.9	13 19 52.23	7 43 18.9	0.5	1.9	0.13
5	14 22.9	13 19 45.12	7 42 35.3	0.5	1.9	0.13
6	14 18.8	13 19 37.88	7 41 50.8	0.5	1.9	0.13
7	14 14.8	13 19 30.50	−7 41 5.5	0.5	1.9	0.13
8	14 10.7	13 19 22.99	7 40 19.5	0.5	1.9	0.13
9	14 6.6	13 19 15.37	7 39 32.8	0.5	1.9	0.13
10	14 2.6	13 19 7.62	7 38 45.4	0.5	1.9	0.13
11	13 58.5	13 18 59.75	7 37 57.3	0.5	1.9	0.13
12	13 54.5	13 18 51.77	−7 37 8.5	0.5	1.9	0.13
13	13 50.4	13 18 43.68	7 36 19.1	0.5	1.9	0.13
14	13 46.3	13 18 35.48	7 35 29.1	0.5	1.9	0.13
15	13 42.2	13 18 27.18	7 34 38.5	0.5	1.9	0.13
16	13 38.2	13 18 18.78	7 33 47.3	0.5	1.9	0.13
17	13 34.1	13 18 10.29	−7 32 55.6	0.5	1.9	0.13
18	13 30.0	13 18 1.70	7 32 3.4	0.5	1.9	0.13
19	13 25.9	13 17 53.02	7 31 10.6	0.5	1.9	0.13
20	13 21.8	13 17 44.26	7 30 17.3	0.5	1.9	0.13
21	13 17.8	13 17 35.41	7 29 23.6	0.5	1.9	0.13
22	13 13.7	13 17 26.49	−7 28 29.5	0.5	1.9	0.13
23	13 9.6	13 17 17.50	7 27 34.9	0.5	1.9	0.13
24	13 5.5	13 17 8.43	7 26 39.9	0.5	1.9	0.13
25	13 1.5	13 16 59.30	7 25 44.5	0.5	1.9	0.13
26	12 57.4	13 16 50.11	7 24 48.8	0.5	1.9	0.13
27	12 53.3	13 16 40.85	−7 23 52.8	0.5	1.9	0.13
28	12 49.2	13 16 31.54	7 22 56.5	0.5	1.9	0.13
29	12 45.1	13 16 22.19	7 21 59.9	0.5	1.9	0.13
30	12 41.0	13 16 12.79	7 21 3.1	0.5	1.9	0.13
31	12 36.9	13 16 3.34	7 20 6.0	0.5	1.9	0.13
Apr. 1	12 32.8	13 15 53.86	−7 19 8.7	0.5	1.9	0.13
2	12 28.7	13 15 44.36	−7 18 11.3	0.5	1.9	0.13

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Apr. 1	12 32.8	13 15 53.86	−7 19 8.7	0.5	1.9	0.13	May 16	9 29.3	13 9 16.33	−6 39 35.6	0.5	1.9	0.13
2	12 28.7	13 15 44.36	7 18 11.3	0.5	1.9	0.13	17	9 25.3	13 9 9.50	6 38 55.7	0.5	1.9	0.13
3	12 24.6	13 15 34.82	7 17 13.8	0.5	1.9	0.13	18	9 21.2	13 9 2.80	6 38 16.6	0.5	1.9	0.13
4	12 20.6	13 15 25.26	7 16 16.1	0.5	1.9	0.13	19	9 17.2	13 8 56.24	6 37 38.4	0.5	1.9	0.13
5	12 16.5	13 15 15.68	7 15 18.3	0.5	1.9	0.13	20	9 13.2	13 8 49.83	6 37 1.1	0.5	1.9	0.18
6	12 12.4	13 15 6.09	−7 14 20.5	0.5	1.9	0.13	21	9 9.1	13 8 43.56	−6 36 24.6	0.5	1.9	0.13
7	12 8.3	13 14 56.49	7 13 22.7	0.5	1.9	0.13	22	9 5.1	13 8 37.43	6 35 49.1	0.5	1.9	0.13
8	12 4.2	13 14 46.88	7 12 24.8	0.5	1.9	0.13	23	9 1.1	13 8 31.46	6 35 14.6	0.5	1.9	0.13
9	12 0.1	13 14 37.27	7 11 26.9	0.5	1.9	0.13	24	8 57.0	13 8 25.64	6 34 41.0	0.5	1.9	0.13
10	11 56.0	13 14 27.67	7 10 29.1	0.5	1.9	0.13	25	8 53.0	13 8 19.98	6 34 8.4	0.5	1.9	0.13
11	11 51.9	13 14 18.07	−7 9 31.4	0.5	1.9	0.13	26	8 49.0	13 8 14.47	−6 33 36.8	0.5	1.9	0.13
12	11 47.8	13 14 8.48	7 8 33.8	0.5	1.9	0.13	27	8 45.0	13 8 9.12	6 33 6.1	0.5	1.9	0.13
13	11 43.7	13 13 58.90	7 7 36.3	0.5	1.9	0.13	28	8 40.9	13 8 3.94	6 32 36.5	0.5	1.9	0.13
14	11 39.6	13 13 49.35	7 6 38.9	0.5	1.9	0.13	29	8 36.9	13 7 58.92	6 32 7.9	0.5	1.9	0.13
15	11 35.6	13 13 39.82	7 5 41.6	0.5	1.9	0.13	30	8 32.9	13 7 54.07	6 31 40.4	0.5	1.9	0.13
16	11 31.5	13 13 30.31	−7 4 44.6	0.5	1.9	0.13	31	8 28.9	13 7 49.38	−6 31 13.9	0.5	1.9	0.13
17	11 27.4	13 13 20.83	7 3 47.8	0.5	1.9	0.13	June 1	8 24.9	13 7 44.87	6 30 48.5	0.5	1.9	0.13
18	11 23.3	13 13 11.39	7 2 51.2	0.5	1.9	0.13	2	8 20.9	13 7 40.53	6 30 24.1	0.5	1.9	0.13
19	11 19.2	13 13 1.98	7 1 54.8	0.5	1.9	0.13	3	8 16.9	13 7 36.37	6 30 0.8	0.5	1.9	0.13
20	11 15.1	13 12 52.61	7 0 58.7	0.5	1.9	0.13	4	8 12.9	13 7 32.38	6 29 38.7	0.5	1.9	0.13
21	11 11.1	13 12 43.29	−7 0 3.0	0.5	1.9	0.13	5	8 8.9	13 7 28.57	−6 29 17.6	0.5	1.9	0.13
22	11 7.0	13 12 34.02	6 59 7.5	0.5	1.9	0.13	6	8 4.9	13 7 24.94	6 28 57.7	0.5	1.9	0.13
23	11 2.9	13 12 24.81	6 58 12.5	0.5	1.9	0.13	7	8 0.9	13 7 21.48	6 28 38.8	0.5	1.9	0.13
24	10 58.8	13 12 15.64	6 57 17.7	0.5	1.9	0.13	8	7 56.9	13 7 18.21	6 28 21.1	0.5	1.9	0.13
25	10 54.7	13 12 6.54	6 56 23.4	0.5	1.9	0.13	9	7 52.9	13 7 15.12	6 28 4.5	0.5	1.9	0.13
26	10 50.6	13 11 57.51	−6 55 29.5	0.5	1.9	0.13	10	7 49.0	13 7 12.21	−6 27 49.0	0.5	1.9	0.13
27	10 46.6	13 11 48.55	6 54 36.1	0.5	1.9	0.13	11	7 45.0	13 7 9.49	6 27 34.8	0.5	1.9	0.13
28	10 42.5	13 11 39.66	6 53 43.1	0.5	1.9	0.13	12	7 41.0	13 7 6.95	6 27 21.7	0.5	1.9	0.13
29	10 38.4	13 11 30.85	6 52 50.6	0.5	1.9	0.13	13	7 37.0	13 7 4.59	6 27 9.7	0.5	1.9	0.13
30	10 34.3	13 11 22.12	6 51 58.7	0.5	1.9	0.13	14	7 33.1	13 7 2.43	6 26 58.9	0.5	1.9	0.13
May 1	10 30.2	13 11 13.47	−6 51 7.2	0.5	1.9	0.13	15	7 29.1	13 7 0.45	−6 26 49.2	0.5	1.9	0.13
2	10 26.2	13 11 4.91	6 50 16.4	0.5	1.9	0.13	16	7 25.1	13 6 58.65	6 26 40.7	0.5	1.9	0.12
3	10 22.1	13 10 56.45	6 49 26.1	0.5	1.9	0.13	17	7 21.2	13 6 57.05	6 26 33.4	0.5	1.9	0.12
4	10 18.0	13 10 48.08	6 48 36.5	0.5	1.9	0.13	18	7 17.2	13 6 55.64	6 26 27.3	0.5	1.9	0.12
5	10 14.0	13 10 39.81	6 47 47.5	0.5	1.9	0.13	19	7 13.3	13 6 54.42	6 26 22.3	0.5	1.9	0.12
6	10 9.9	13 10 31.64	−6 46 59.1	0.5	1.9	0.13	20	7 9.3	13 6 53.39	−6 26 18.5	0.5	1.9	0.12
7	10 5.8	13 10 23.58	6 46 11.4	0.5	1.9	0.13	21	7 5.4	13 6 52.55	6 26 15.9	0.5	1.9	0.12
8	10 1.7	13 10 15.64	6 45 24.4	0.5	1.9	0.13	22	7 1.4	13 6 51.91	6 26 14.5	0.5	1.9	0.12
9	9 57.7	13 10 7.80	6 44 38.2	0.5	1.9	0.13	23	6 57.5	13 6 51.46	6 26 14.3	0.5	1.9	0.12
10	9 53.6	13 10 0.08	6 43 52.6	0.5	1.9	0.13	24	6 53.5	13 6 51.20	6 26 15.3	0.5	1.8	0.12
11	9 49.6	13 9 52.48	−6 43 7.8	0.5	1.9	0.13	25	6 49.6	13 6 51.14	−6 26 17.5	0.5	1.8	0.12
12	9 45.5	13 9 45.00	6 42 23.8	0.5	1.9	0.13	26	6 45.7	13 6 51.28	6 26 20.0	0.5	1.8	0.12
13	9 41.5	13 9 37.64	6 41 40.5	0.5	1.9	0.13	27	6 41.8	13 6 51.67	6 26 25.6	0.5	1.8	0.12
14	9 37.4	13 9 30.40	6 40 58.1	0.5	1.9	0.13	28	6 37.8	13 6 52.11	6 26 31.4	0.5	1.8	0.12
15	9 33.4	13 9 23.30	6 40 16.4	0.5	1.9	0.13	29	6 33.9	13 6 52.87	6 26 38.4	0.5	1.8	0.12
16	9 29.3	13 9 16.33	−6 39 35.6	0.5	1.9	0.13	30	6 30.0	13 6 53.79	−6 26 46.7	0.5	1.8	0.12
17	9 25.3	13 9 9.50	−6 38 55.7	0.5	1.9	0.13	July 1	6 26.1	13 6 54.91	−6 26 56.2	0.5	1.8	0.12

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Jan. 1	9 4.7	3 52 20.16	+18 28 4.1	0.3	1.3	0.09	Feb. 15	6 6.2	3 50 48.32	+18 25 58.1	0.3	1.3	0.09
2	9 0.7	3 52 15.38	18 27 52.2	0.3	1.3	0.09	16	6 2.3	3 50 49.43	18 26 5.3	0.3	1.3	0.09
3	8 56.7	3 52 10.71	18 27 40.7	0.3	1.3	0.09	17	5 58.4	3 50 50.68	18 26 13.0	0.3	1.3	0.09
4	8 52.6	3 52 6.14	18 27 29.6	0.3	1.3	0.09	18	5 54.5	3 50 52.07	18 26 21.1	0.3	1.3	0.09
5	8 48.6	3 52 1.69	18 27 18.9	0.3	1.3	0.09	19	5 50.6	3 50 53.60	18 26 29.7	0.3	1.3	0.09
6	8 44.6	3 51 57.35	+18 27 8.5	0.3	1.3	0.09	20	5 46.7	3 50 55.28	+18 26 38.7	0.3	1.3	0.09
7	8 40.6	3 51 53.13	18 26 58.5	0.3	1.3	0.09	21	5 42.8	3 50 57.09	18 26 48.1	0.3	1.3	0.09
8	8 36.6	3 51 49.01	18 26 48.9	0.3	1.3	0.09	22	5 38.9	3 50 59.04	18 26 57.9	0.3	1.3	0.09
9	8 32.6	3 51 45.01	18 26 39.7	0.3	1.3	0.09	23	5 35.0	3 51 1.13	18 27 8.1	0.3	1.3	0.09
10	8 28.6	3 51 41.12	18 26 30.9	0.3	1.3	0.09	24	5 31.1	3 51 3.36	18 27 18.8	0.3	1.3	0.09
11	8 24.6	3 51 37.35	+18 26 22.5	0.3	1.3	0.09	25	5 27.2	3 51 5.73	+18 27 29.9	0.3	1.3	0.09
12	8 20.7	3 51 33.70	18 26 14.5	0.3	1.3	0.09	26	5 23.3	3 51 8.24	18 27 41.4	0.3	1.3	0.09
13	8 16.7	3 51 30.18	18 26 6.9	0.3	1.3	0.09	27	5 19.4	3 51 10.88	18 27 53.3	0.3	1.3	0.09
14	8 12.7	3 51 26.78	18 25 59.7	0.3	1.3	0.09	28	5 15.5	3 51 13.67	18 28 5.6	0.3	1.3	0.09
15	8 8.7	3 51 23.49	18 25 52.9	0.3	1.3	0.09	29	5 11.7	3 51 16.59	+18 28 18.3	0.3	1.3	0.09
16	8 4.7	3 51 20.34	+18 25 46.5	0.3	1.3	0.09	Sept. 1	17 24.6	4 11 41.16	+19 26 13.2	0.3	1.3	0.09
17	8 0.7	3 51 17.31	18 25 40.5	0.3	1.3	0.09	2	17 20.7	4 11 41.77	19 26 11.6	0.3	1.3	0.09
18	7 56.7	3 51 14.40	18 25 35.0	0.3	1.3	0.09	3	17 16.8	4 11 42.24	19 26 9.6	0.3	1.3	0.09
19	7 52.8	3 51 11.62	18 25 29.9	0.3	1.3	0.09	4	17 12.8	4 11 42.57	19 26 7.3	0.3	1.3	0.09
20	7 48.8	3 51 8.98	18 25 25.2	0.3	1.3	0.09	5	17 8.9	4 11 42.76	19 26 4.7	0.3	1.3	0.09
21	7 44.8	3 51 6.46	+18 25 20.9	0.3	1.3	0.09	6	17 5.0	4 11 42.81	+19 26 1.7	0.3	1.3	0.09
22	7 40.9	3 51 4.08	18 25 17.1	0.3	1.3	0.09	7	17 1.1	4 11 42.73	19 25 58.4	0.3	1.3	0.09
23	7 36.9	3 51 1.83	18 25 13.7	0.3	1.3	0.09	8	16 57.1	4 11 42.50	19 25 54.7	0.3	1.3	0.09
24	7 32.9	3 50 59.71	18 25 10.7	0.3	1.3	0.09	9	16 53.2	4 11 42.14	19 25 50.6	0.3	1.3	0.09
25	7 28.9	3 50 57.73	18 25 8.2	0.3	1.3	0.09	10	16 49.2	4 11 41.65	19 25 46.2	0.3	1.3	0.09
26	7 25.0	3 50 55.88	+18 25 6.1	0.3	1.3	0.09	11	16 45.3	4 11 41.01	+19 25 41.5	0.3	1.3	0.09
27	7 21.0	3 50 54.17	18 25 4.4	0.3	1.3	0.09	12	16 41.4	4 11 40.24	19 25 36.4	0.3	1.3	0.09
28	7 17.1	3 50 52.60	18 25 3.2	0.3	1.3	0.09	13	16 37.4	4 11 39.34	19 25 31.0	0.3	1.3	0.09
29	7 13.1	3 50 51.16	18 25 2.4	0.3	1.3	0.09	14	16 33.5	4 11 38.30	19 25 25.3	0.3	1.3	0.09
30	7 9.2	3 50 49.87	18 25 2.1	0.3	1.3	0.09	15	16 29.5	4 11 37.12	19 25 19.2	0.3	1.3	0.09
31	7 5.2	3 50 48.71	+18 25 2.3	0.3	1.3	0.09	16	16 25.6	4 11 35.80	+19 25 12.7	0.3	1.3	0.09
Feb. 1	7 1.3	3 50 47.69	18 25 2.9	0.3	1.3	0.09	17	16 21.6	4 11 34.35	19 25 5.9	0.3	1.3	0.09
2	6 57.3	3 50 46.81	18 25 3.9	0.3	1.3	0.09	18	16 17.6	4 11 32.76	19 24 58.8	0.3	1.3	0.09
3	6 53.4	3 50 46.07	18 25 5.4	0.3	1.3	0.09	19	16 13.7	4 11 31.04	19 24 51.3	0.3	1.3	0.09
4	6 49.4	3 50 45.48	18 25 7.3	0.3	1.3	0.09	20	16 9.7	4 11 29.19	19 24 43.6	0.3	1.3	0.09
5	6 45.5	3 50 45.03	+18 25 9.7	0.3	1.3	0.09	21	16 5.8	4 11 27.21	+19 24 35.5	0.3	1.3	0.09
6	6 41.6	3 50 44.72	18 25 12.6	0.3	1.3	0.09	22	16 1.8	4 11 25.09	19 24 27.0	0.3	1.3	0.09
7	6 37.6	3 50 44.55	18 25 15.9	0.3	1.3	0.09	23	15 57.8	4 11 22.84	19 24 18.2	0.3	1.3	0.09
8	6 33.7	3 50 44.53	18 25 19.6	0.3	1.3	0.09	24	15 53.9	4 11 20.45	19 24 9.1	0.3	1.3	0.09
9	6 29.8	3 50 44.65	18 25 23.7	0.3	1.3	0.09	25	15 49.9	4 11 17.94	19 23 59.7	0.3	1.3	0.09
10	6 25.8	3 50 44.90	+18 25 28.4	0.3	1.3	0.09	26	15 45.9	4 11 15.30	+19 23 50.0	0.3	1.3	0.09
11	6 21.9	3 50 45.30	18 25 33.4	0.3	1.3	0.09	27	15 41.9	4 11 12.53	19 23 40.0	0.3	1.3	0.09
12	6 18.0	3 50 45.85	18 25 38.9	0.3	1.3	0.09	28	15 37.9	4 11 9.64	19 23 29.7	0.3	1.3	0.09
13	6 14.1	3 50 46.53	18 25 44.8	0.3	1.3	0.09	29	15 34.0	4 11 6.62	19 23 19.0	0.3	1.3	0.09
14	6 10.1	3 50 47.35	18 25 51.2	0.3	1.3	0.09	30	15 30.0	4 11 3.47	19 23 8.1	0.3	1.3	0.09
15	6 6.2	3 50 48.32	+18 25 58.1	0.3	1.3	0.09	Oct. 1	15 26.0	4 11 0.20	+19 22 56.9	0.3	1.3	0.09
16	6 2.3	3 50 49.43	+18 26 5.3	0.3	1.3	0.09	2	15 22.0	4 10 56.81	+19 22 45.3	0.3	1.3	0.09

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Oct. 1	15 26.0	4 11 0.20	+19 22 56.9	0.3	1.3	0.09	Nov. 16	12 20.9	4 6 46.34	+19 10 25.8	0.3	1.3	0.09
2	15 22.0	4 10 56.81	19 22 45.3	0.3	1.3	0.09	17	12 16.8	4 6 39.38	19 10 6.7	0.3	1.3	0.09
3	15 18.0	4 10 53.30	19 22 33.5	0.3	1.3	0.09	18	12 12.8	4 6 32.39	19 9 47.5	0.3	1.3	0.09
4	15 14.0	4 10 49.67	19 22 21.4	0.3	1.3	0.09	19	12 8.7	4 6 25.39	19 9 28.3	0.3	1.3	0.09
5	15 10.0	4 10 45.93	19 22 9.1	0.3	1.3	0.09	20	12 4.7	4 6 18.37	19 9 9.1	0.3	1.3	0.09
6	15 6.0	4 10 42.07	+19 21 56.5	0.3	1.3	0.09	21	12 0.6	4 6 11.34	+19 8 49.9	0.3	1.3	0.09
7	15 2.0	4 10 38.10	19 21 43.6	0.3	1.3	0.09	22	11 56.6	4 6 4.31	19 8 30.8	0.3	1.3	0.09
8	14 58.0	4 10 34.01	19 21 30.4	0.3	1.3	0.09	23	11 52.5	4 5 57.28	19 8 11.7	0.3	1.3	0.09
9	14 54.0	4 10 29.81	19 21 17.0	0.3	1.3	0.09	24	11 48.5	4 5 50.24	19 7 52.6	0.3	1.3	0.09
10	14 50.0	4 10 25.49	19 21 3.3	0.3	1.3	0.09	25	11 44.5	4 5 43.19	19 7 33.6	0.3	1.3	0.09
11	14 46.0	4 10 21.07	+19 20 49.3	0.3	1.3	0.09	26	11 40.4	4 5 36.13	+19 7 14.6	0.3	1.3	0.09
12	14 42.0	4 10 16.55	19 20 35.1	0.3	1.3	0.09	27	11 36.4	4 5 29.08	19 6 55.6	0.3	1.3	0.09
13	14 38.0	4 10 11.93	19 20 20.7	0.3	1.3	0.09	28	11 32.3	4 5 22.05	19 6 36.8	0.3	1.3	0.09
14	14 34.0	4 10 7.20	19 20 6.1	0.3	1.3	0.09	29	11 28.3	4 5 15.04	19 6 18.0	0.3	1.3	0.09
15	14 30.0	4 10 2.36	19 19 51.2	0.3	1.3	0.09	30	11 24.2	4 5 8.04	19 5 59.4	0.3	1.3	0.09
16	14 26.0	4 9 57.42	+19 19 36.0	0.3	1.3	0.09	Dec. 1	11 20.2	4 5 1.06	+19 5 40.8	0.3	1.3	0.09
17	14 22.0	4 9 52.38	19 19 20.7	0.3	1.3	0.09	2	11 16.1	4 4 54.10	19 5 22.3	0.3	1.3	0.09
18	14 17.9	4 9 47.24	19 19 5.1	0.3	1.3	0.09	3	11 12.1	4 4 47.15	19 5 4.0	0.3	1.3	0.09
19	14 13.9	4 9 42.00	19 18 49.3	0.3	1.3	0.09	4	11 8.0	4 4 40.22	19 4 45.7	0.3	1.3	0.09
20	14 9.9	4 9 36.68	19 18 33.3	0.3	1.3	0.09	5	11 4.0	4 4 33.32	19 4 27.6	0.3	1.3	0.09
21	14 5.9	4 9 31.28	+19 18 17.1	0.3	1.3	0.09	6	10 59.9	4 4 26.46	+19 4 9.6	0.3	1.3	0.09
22	14 1.9	4 9 25.78	19 18 0.7	0.3	1.3	0.09	7	10 55.9	4 4 19.64	19 3 51.7	0.3	1.3	0.09
23	13 57.8	4 9 20.20	19 17 44.1	0.3	1.3	0.09	8	10 51.8	4 4 12.86	19 3 34.0	0.3	1.3	0.09
24	13 53.8	4 9 14.52	19 17 27.3	0.3	1.3	0.09	9	10 47.8	4 4 6.11	19 3 16.5	0.3	1.3	0.09
25	13 49.8	4 9 8.76	19 17 10.3	0.3	1.3	0.09	10	10 43.8	4 3 59.40	19 2 59.1	0.3	1.3	0.09
26	13 45.7	4 9 2.92	+19 16 53.1	0.3	1.3	0.09	11	10 39.7	4 3 52.73	+19 2 41.9	0.3	1.3	0.09
27	13 41.7	4 8 57.00	19 16 35.8	0.3	1.3	0.09	12	10 35.7	4 3 46.10	19 2 24.8	0.3	1.3	0.09
28	13 37.7	4 8 51.02	19 16 18.4	0.3	1.3	0.09	13	10 31.6	4 3 39.52	19 2 7.9	0.3	1.3	0.09
29	13 33.7	4 8 44.96	19 16 0.8	0.3	1.3	0.09	14	10 27.6	4 3 33.00	19 1 51.3	0.3	1.3	0.09
30	13 29.6	4 8 38.84	19 15 43.1	0.3	1.3	0.09	15	10 23.6	4 3 26.54	19 1 34.8	0.3	1.3	0.09
31	13 25.6	4 8 32.65	+19 15 25.2	0.3	1.3	0.09	16	10 19.5	4 3 20.14	+19 1 18.6	0.3	1.3	0.09
Nov. 1	13 21.6	4 8 26.38	19 15 7.2	0.3	1.3	0.09	17	10 15.5	4 3 13.80	19 1 2.5	0.3	1.3	0.09
2	13 17.5	4 8 20.05	19 14 49.0	0.3	1.3	0.09	18	10 11.4	4 3 7.52	19 0 46.7	0.3	1.3	0.09
3	13 13.5	4 8 13.65	19 14 30.7	0.3	1.3	0.09	19	10 7.4	4 3 1.30	19 0 31.1	0.3	1.3	0.09
4	13 9.4	4 8 7.21	19 14 12.4	0.3	1.3	0.09	20	10 3.4	4 2 55.14	19 0 15.8	0.3	1.3	0.09
5	13 5.4	4 8 0.72	+19 13 53.9	0.3	1.3	0.09	21	9 59.4	4 2 49.05	+19 0 0.6	0.3	1.3	0.09
6	13 1.3	4 7 54.17	19 13 35.4	0.3	1.3	0.09	22	9 55.3	4 2 43.04	18 59 45.7	0.3	1.3	0.09
7	12 57.3	4 7 47.58	19 13 16.7	0.3	1.3	0.09	23	9 51.3	4 2 37.11	18 59 31.1	0.3	1.3	0.09
8	12 53.2	4 7 40.94	19 12 58.0	0.3	1.3	0.09	24	9 47.3	4 2 31.27	18 59 16.8	0.3	1.3	0.09
9	12 49.2	4 7 34.25	19 12 39.1	0.3	1.3	0.09	25	9 43.2	4 2 25.50	18 59 2.7	0.3	1.3	0.09
10	12 45.2	4 7 27.50	+19 12 20.3	0.3	1.3	0.09	26	9 39.2	4 2 19.82	+18 58 48.9	0.3	1.3	0.09
11	12 41.1	4 7 20.71	19 12 1.3	0.3	1.3	0.09	27	9 35.2	4 2 14.21	18 58 35.4	0.3	1.3	0.09
12	12 37.1	4 7 13.90	19 11 42.2	0.3	1.3	0.09	28	9 31.2	4 2 8.60	18 58 22.2	0.3	1.3	0.09
13	12 33.0	4 7 7.05	19 11 23.2	0.3	1.3	0.09	29	9 27.1	4 2 3.25	18 58 9.2	0.3	1.3	0.09
14	12 29.0	4 7 0.18	19 11 4.1	0.3	1.3	0.09	30	9 23.1	4 1 57.92	18 57 56.6	0.3	1.3	0.09
15	12 24.9	4 6 53.28	+19 10 45.0	0.3	1.3	0.09	31	9 19.1	4 1 52.69	+18 57 44.3	0.3	1.3	0.09
16	12 20.9	4 6 46.34	+19 10 25.8	0.3	1.3	0.09	32	9 15.1	4 1 47.55	+18 57 32.3	0.3	1.3	00.9

PART III

PHENOMENA

ECLIPSES IN 1889.

In the year 1889 there will be five eclipses, three of the sun and two of the moon.

I.—*A Total Eclipse of the Sun*, 1889, January 1, partly visible at Washington, as a partial eclipse; the sun setting eclipsed.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of ☌ in right ascension, January 1d 9h 16m 0s.5

Sun and moon's R. A.	18h 51m 1s.22	Hourly motions	11s.03 and 161s.52
Sun's declination	22° 56′ 3″.5 S.	Hourly motion	0′ 13″.4 N.
Moon's declination	22 3 56.3 S.	Hourly motion	0 7.0 S.
Sun's equa. hor. parallax	8.7	Sun's true semidiameter	16 16.2
Moon's equa. hor. parallax	60 44.7	Moon's true semidiameter	16 32.4

CIRCUMSTANCES OF THE ECLIPSE.

		d h m	Longitude from Greenwich.	Latitude.
Eclipse begins	January	1 7 3.6	179° 47′.4 W.	31° 34′.6 N.
Central eclipse begins		1 8 24.1	179 16.3 E.	53 3.5 N.
Central eclipse at noon		1 9 16.0	137 57.3 W.	36 41.4 N.
Central eclipse ends		1 10 9.6	94 27.9 W.	52 14.8 N.
Eclipse ends		1 11 30.1	95 58.8 W.	30 37.5 N.

II.—*A Partial Eclipse of the Moon*, 1889, January 16, visible at Washington, and generally in Europe, Africa, North and South America, and the Atlantic and Pacific Oceans.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of ☍ in right ascension, January 16d 17h 22m 48s.3

Sun's right ascension	19h 57m 42s.46	Hourly motion	10s.67
Moon's right ascension	7 57 42.46	Hourly motion	132.07
Sun's declination	20° 41′ 58″.1 S.	Hourly motion	0′ 29″.9 N.
Moon's declination	21 15 48.2 N.	Hourly motion	3 14.6 S.
Sun's equa. hor. parallax	8.7	Sun's true semidiameter	16 15.6
Moon's equa. hor. parallax	55 9.3	Moon's true semidiameter	15 1.1

TIMES OF THE PHASES.

	Greenwich Mean Time.		Washington Mean Time.	
		d h m		d h m
Moon enters penumbra	January	16 14 37.5	January	16 9 29.3
Moon enters shadow		16 15 58.2		16 10 50.0
Middle of the eclipse		16 17 29.7		16 12 21.5
Moon leaves shadow		16 19 1.2		16 13 53.0
Moon leaves penumbra		16 20 21.7		16 15 13.5

CIRCUMSTANCES OF THE ECLIPSE.

Contacts of Shadow with moon's limb.	Angles of position from north point.	The moon being in the zenith in longitude from Greenwich and in latitude.	
First	133°.3 to E.	58° 47′ W.	21° 20′ N.
Last	122.0 to W.	102 56 W.	21 10 N.

Magnitude of the eclipse = 0.702, (moon's diameter = 1).

III.—*An Annular Eclipse of the Sun*, 1889, June 27, invisible at Washington.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of ☌ in right ascension, June $27^{d}\ 20^{h}\ 56^{m}\ 53^{s}.6$

	h m s		s s
Sun and moon's R. A.	6 29 34.11	Hourly motions	10.37 and 128.46
Sun's declination	23° 16′ 43.5″ N.	Hourly motion	0′ 7.3″ S.
Moon's declination	22 47 25.6 N.	Hourly motion	1 12.4 N.
Sun's equa. hor. parallax	8.4	Sun's true semidiameter	15 44.0
Moon's equa. hor. parallax	53 59.4	Moon's true semidiameter	14 42.0

CIRCUMSTANCES OF THE ECLIPSE.

	d h m	Longitude from Greenwich.	Latitude.
Eclipse begins	June 27 18 6.1	8° 25.0′ E.	20° 22.6′ S.
Central eclipse begins	27 19 20.7	3 26.3 W.	32 37.0 S.
Central eclipse at noon	27 20 56.9	46 31.3 E.	9 45.1 S.
Central eclipse ends	27 22 39.4	97 52.6 E.	27 37.4 S.
Eclipse ends	27 23 54.0	85 4.9 E.	16 10.9 S.

IV.—*A Partial Eclipse of the Moon*, 1889, July 12, invisible at Washington, but visible generally in Europe, Asia, Africa, Australia, the Atlantic Ocean, and the easterly portion of South America.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of ☍ in right ascension, July $12^{d}\ 8^{h}\ 49^{m}\ 39^{s}.1$

	h m s		s
Sun's right ascension	7 29 9.05	Hourly motion	10.16
Moon's right ascension	19 29 9.05	Hourly motion	163.70
Sun's declination	21° 52′ 18.2″ N.	Hourly motion	0′ 21.6″ S.
Moon's declination	22 39 9.7 S.	Hourly motion	2 16.6 N.
Sun's equa. hor. parallax	8.4	Sun's true semidiameter	15 44.2
Moon's equa. hor. parallax	61 6.1	Moon's true semidiameter	16 38.2

TIMES OF THE PHASES.

	Greenwich Mean Time.	Washington Mean Time.
	d h m	d h m
Moon enters penumbra	July 12 6 33.2	July 12 1 25.0
Moon enters shadow	12 7 42.3	12 2 34.1
Middle of the eclipse	12 8 54.0	12 3 45.8
Moon leaves shadow	12 10 5.6	12 4 57.4
Moon leaves penumbra	12 11 14.6	12 6 6.4

CIRCUMSTANCES OF THE ECLIPSE.

Contacts of Shadow with moon's limb.	Angles of position from north point.	The moon being in the zenith in longitude from Greenwich and in latitude.	
First	39° to E.	62° 21′ E.	22° 42′ S.
Last	45 to W.	28 3 E.	22 36 S.

Magnitude of the eclipse = 0.486, (moon's diameter = 1).

V.—*A Total Eclipse of the Sun*, 1889, December 21—2, **invisible at Washington.**

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of ☌ in right ascension, December $22^{d}\ 0^{h}\ 52^{m}\ 30^{s}.3$

Sun and moon's R. A.	$18^{h}\ 4^{m}\ 4^{s}.55$	Hourly motions	$11^{s}.11$ and $45^{s}.29$
Sun's declination	$23^{\circ}\ 26'\ 59''.9$ S.	Hourly motion	$0'\ 1''.1$ N.
Moon's declination	23 15 25.1 S.	Hourly motion	3 15.0 S.
Sun's equa. hor. parallax	8.7	Sun's true semidiameter	16 15.9
Moon's equa. hor. parallax	61 18.7	Moon's true semidiameter	16 41.6

CIRCUMSTANCES OF THE ECLIPSE.

			Longitude from Greenwich.	Latitude.
Eclipse begins	December	$21^{d}\ 22^{h}\ 16^{m}.7$	$59^{\circ}\ 25'.7$ W.	$11^{\circ}\ 22'.9$ N.
Central eclipse begins		21 23 13.0	71 53.0 W.	14 52.8 N.
Central eclipse at noon		22 0 52.5	13 22.5 W.	13 37.0 S.
Central eclipse ends		22 2 35.6	48 35.6 E.	5 11.2 N.
Eclipse ends		22 3 31.9	36 4.1 E.	1 40.2 N.

The regions within which the solar eclipses are visible, are laid down on the accompanying charts, from which, by means of the dotted lines, the Greenwich time of beginning or ending within fifteen or twenty minutes, may also be found.

BESSELIAN ELEMENTS OF THE TOTAL ECLIPSE OF THE SUN, 1889, JANUARY 1.

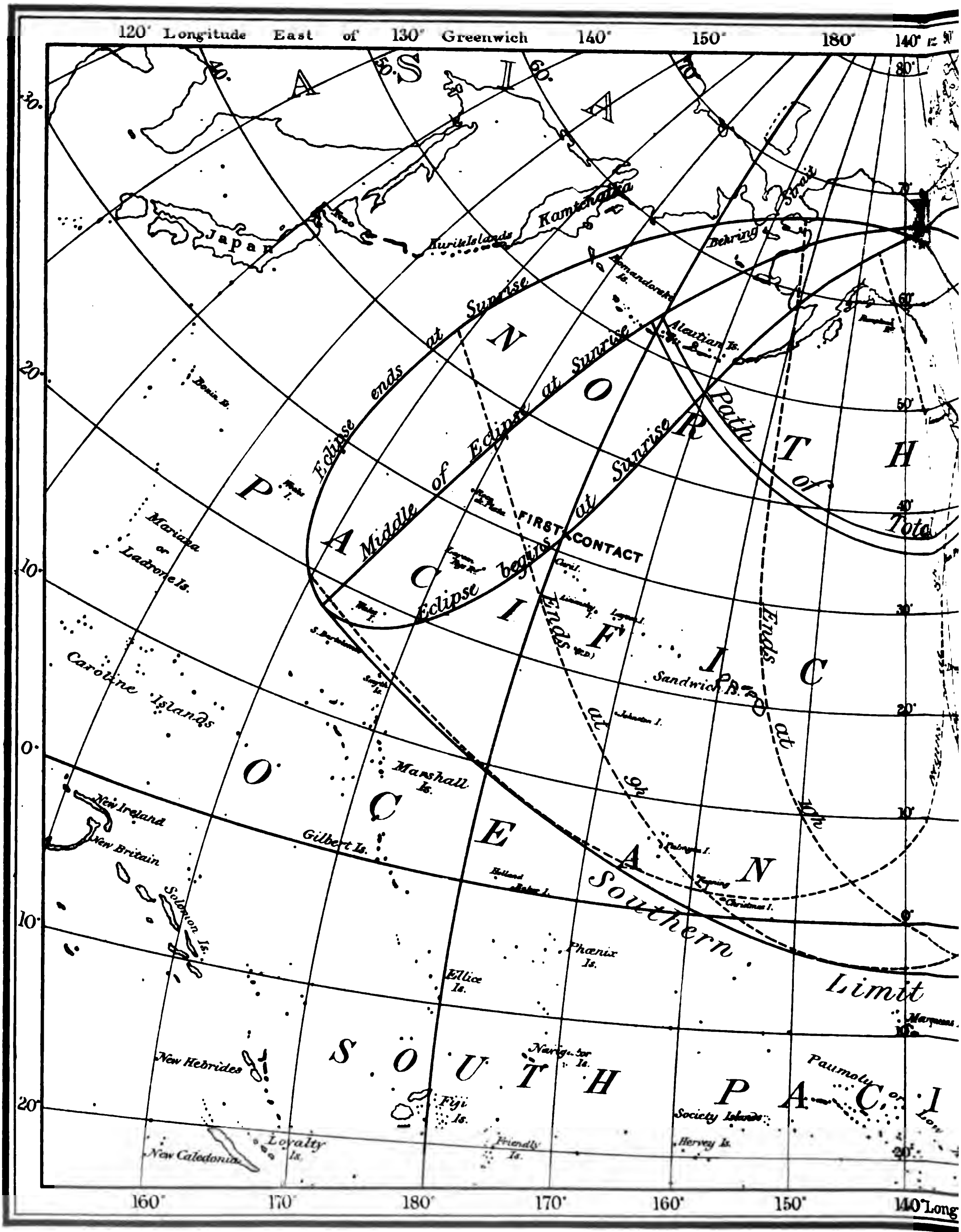
Greenwich Mean Time.	Co-ordinates of Axis of Shadow On Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra and Shadow On Fundamental Plane.	
	x	y	Log sin d	Log cos d	μ	l	l'
h m					° ′		
7 0	−1.30428	+0.87285	−9.59089	+9.96420	103 57.6	+0.54115	−0.00470
10	1.20839	0.87187	9.59087	9.96420	106 27.6	0.54117	0.00468
20	1.11250	0.87089	9.59086	9.96421	108 57.6	0.54119	0.00466
30	1.01661	0.86992	9.59085	9.96421	111 27.5	0.54121	0.00464
40	0.92072	0.86896	9.59084	9.96421	113 57.5	0.54123	0.00462
50	0.82482	0.86801	9.59083	9.96421	116 27.5	0.54125	0.00460
8 0	−0.72892	+0.86707	−9.59082	+9.96421	118 57 4	+0.54127	−0.00458
10	0.63302	0.86613	9.59081	9.96422	121 27.4	0.54129	0.00456
20	0.53712	0.86520	9.59080	9.96422	123 57.3	0.54130	0.00455
30	0.44122	0.86427	9.59079	9.96422	126 27.3	0.54132	0.00453
40	0.34532	0.86335	9.59078	9.96422	128 57.3	0.54134	0.00452
50	0.24942	0.86244	9.59077	9.96422	131 27.2	0.54135	0.00450
9 0	−0.15352	+0.86153	−9.59076	+9.96423	133 57.2	+0.54136	−0.00449
10	−0.05762	0.86063	9.59074	9.96423	136 27.2	0.54138	0.00448
20	+0.03828	0.85974	9.59073	9.96423	138 57.1	0.54139	0.00447
30	0.13418	0.85886	9.59072	9.96423	141 27.1	0.54140	0.00446
40	0.23008	0.85798	9.59071	9.96423	143 57.1	0.54141	0.00445
50	0.32597	0.85711	9.59070	9.96424	146 27.0	0.54142	0.00444
10 0	+0.42186	+0.85625	−9.59069	+9.96424	148 57.0	+0.54143	−0.00443
10	0.51776	0.85540	9.59067	9.96424	151 27.0	0.54144	0.00442
20	0.61365	0.85455	9.59066	9.96424	153 56.9	0.54145	0.00442
30	0.70955	0.85371	9.59065	9.96424	156 26.9	0.54145	0.00441
40	0.80544	0.85287	9.59064	9.96425	158 56.9	0.54146	0.00440
50	0.90133	0.85204	9.59063	9.96425	161 26.8	0.54146	0.00440
11 0	+0.99722	+0.85122	−9.59062	+9.96425	163 56.8	+0.54147	−0.00439
10	1.09310	0.85041	9.59061	9.96425	166 26.8	0.54147	0.00439
20	1.18898	0.84960	9.59060	9.96425	168 56.7	0.54147	0.00438
30	1.28485	0.84880	9.59059	9.96426	171 26.7	0.54148	0.00438
40	+1.38072	+0.84801	−9.59058	+9.96426	173 56.7	+0.54148	−0.00437

Greenwich Mean Time.	Log Δ x for 1 Minute.	Log Δ y for 1 Minute.	Log Δ μ for 1 Minute.	Log Tangents of Angles of Cones—	
				Penumbra.	Shadow.
h m					
7 0	+7.9817	−5.9926	+1.1760	+7.67719	+7.67508
8 0	7.9818	5.9745	1.1760	7.67719	7.67508
9 0	7.9818	5.9550	1.1760	7.67719	7.67508
10 0	7.9818	5.9342	1.1760	7.67719	7.67508
11 0	7.9817	5.9115	1.1760	7.67719	7.67508
12 0	+7.9816	−5.8870	+1.1760	+7.67719	+7.67508

PATH OF THE SHADOW DURING THE TOTAL ECLIPSE OF THE SUN, 1889, JANUARY 1.

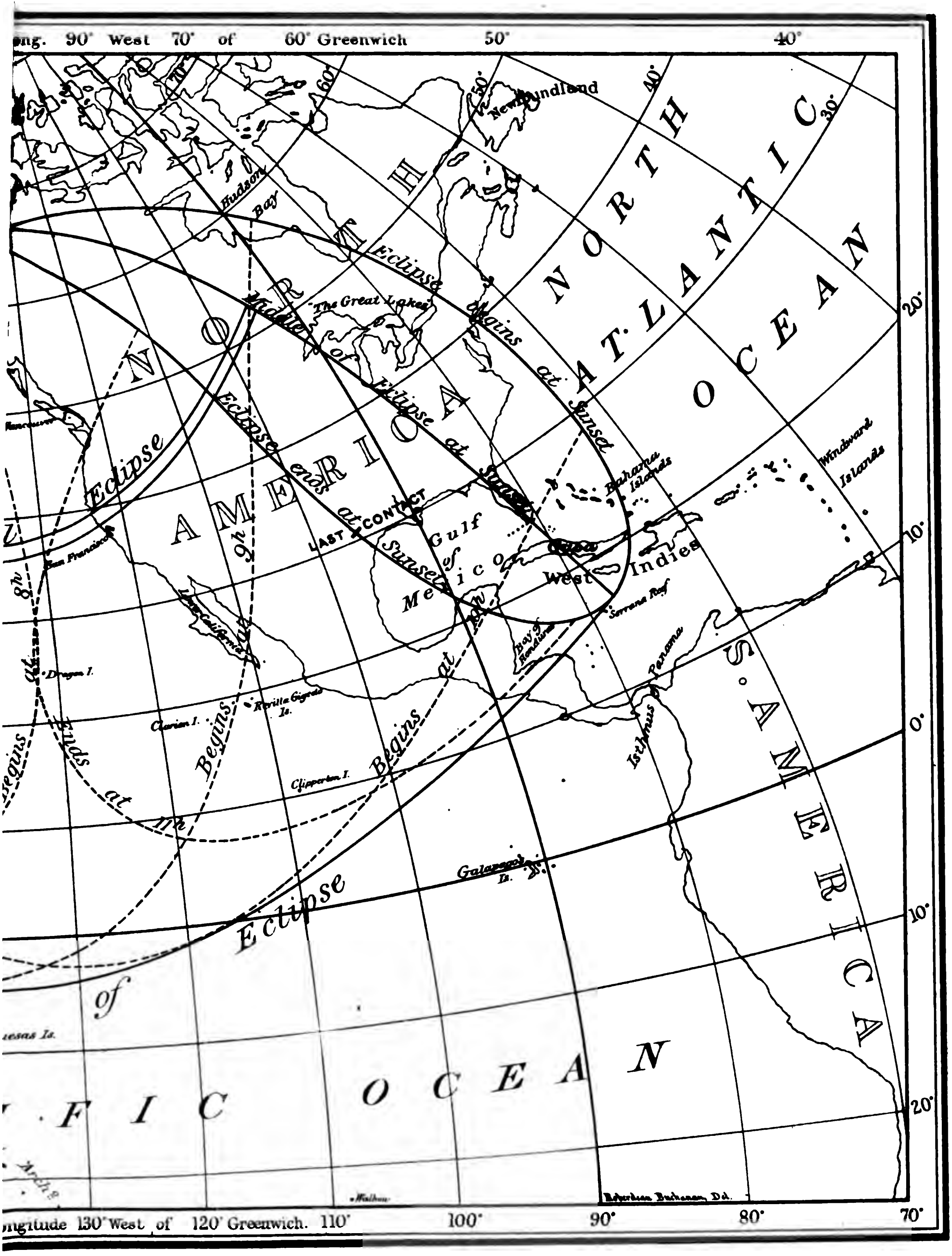
Greenwich Mean Time.	Northern Limit of Shadow Path.		Central Line.		Southern Limit of Shadow Path.		Duration of Totality on Central Line.
	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	
	° ′	° ′	° ′	° ′	° ′	° ′	m s
Limits	+53 18.0	179 31.9 E.	+53 3.5	179 16.3 E.	+52 30.3	178 48.1 E.	
8^h 25^m	51 36.0	176 42.6 W.	49 42.8	174 14.1 W.	47 49.6	171 45.6 W.	1 16.6
30	+46 8.3	165 49.5	+45 4.6	165 2.8	+44 0.8	164 16.2	1 33.3
35	43 36.2	160 28.1	42 41.6	160 0.0	41 47.0	159 32.0	1 43.5
40	41 53.9	156 28.8	41 2.5	156 9.1	40 11.1	155 49.5	1 51.5
45	40 37.5	153 10.9	39 48.0	152 56.5	38 58.5	152 42.2	1 57.8
50	39 38.7	150 16.9	38 50.3	150 6.2	38 1.8	149 55.6	2 3.0
55	38 53.3	147 38.8	38 5.6	147 31.0	37 17.8	147 23.2	2 7.2
9 0	+38 18.8	145 11.5	+37 31.6	145 6.1	+36 44.3	145 0.6	2 10.4
5	37 53.9	142 51.6	37 6.9	142 48.2	36 19.9	142 44.7	2 12.8
10	37 37.3	140 36.2	36 50.5	140 34.6	36 3.7	140 33.0	2 14.2
15	37 28.8	138 23.5	36 42.2	138 23.6	35 55.5	138 23.7	2 14.9
20	37 28.2	136 11.4	36 41.6	136 13.2	35 54.9	136 14.9	2 14.7
25	37 35.1	133 58.1	36 48.4	134 1.6	36 1.8	134 5.1	2 13.6
30	+37 50.0	131 41.7	+37 3.2	131 47.1	+36 16.5	131 52.4	2 11.7
35	38 13.7	129 20.0	37 26.7	129 27.4	36 39.7	129 34.8	2 8.9
40	38 47.2	126 50.0	37 59.8	126 59.8	37 12.4	127 9.6	2 5.2
45	39 31.8	124 9.5	38 43.8	124 21.0	37 55.7	124 33.6	2 0.6
50	40 30.6	121 8.7	39 41.5	121 25.4	38 52.4	121 42.2	1 54.9
55	41 48.3	117 41.7	40 57.4	118 4.1	40 6.4	118 26.6	1 48.0
10 0	+43 35.5	113 28.4	+42 41.0	113 59.5	+41 46.4	114 30.6	1 39.5
5	46 43.0	107 8.0	45 39.0	108 3.7	44 34.9	108 59.5	1 28.0
Limits	+52 28.3	94 41.9 W.	+52 14.8	94 27.9 W.	+51 42.6	94 2.5 W.	

TOTAL ECLIPSE of JA



Note.– *The hours of beginning and ending ar*

F JANUARY 1ST 1889.



are expressed in Greenwich Mean Time.

BESSELIAN ELEMENTS OF THE ANNULAR ECLIPSE OF THE SUN, 1889, JUNE 27.

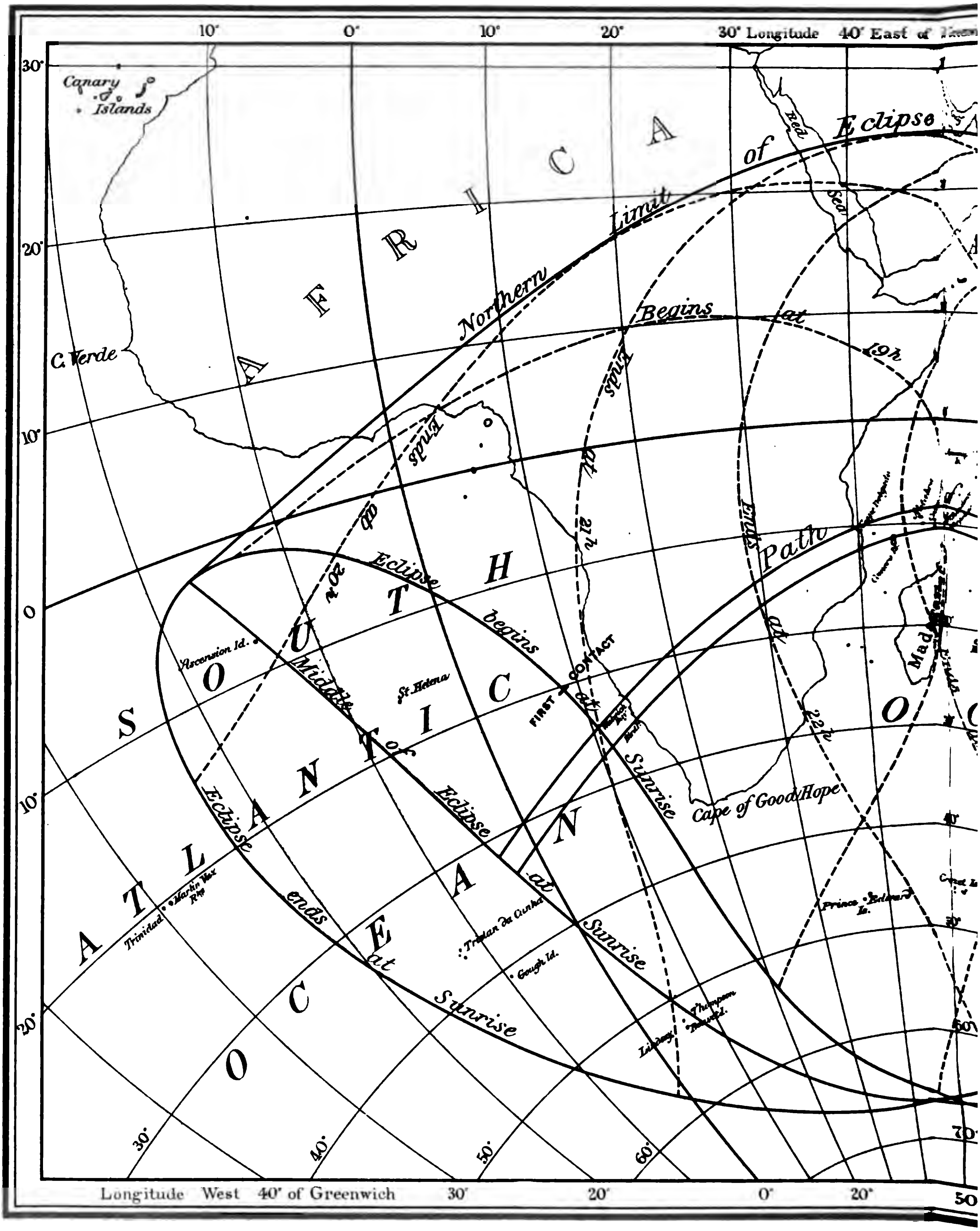
Greenwich Mean Time.	Co-ordinates of Axis of Shadow On Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra and Shadow On Fundamental Plane.	
	x	y	Log sin d	Log cos d	μ	l	l'
h m							
18 0	−1.48992	−0.61809	+9.59695	+9.96310	269° 15′.4	+0.56513	+0.01916
10	1.40571	0.61385	9.59694	9.96310	271 45.4	0.56513	0.01916
20	1.32150	0.60961	9.59694	9.96310	274 15.4	0.56513	0.01917
30	1.23729	0.60538	9.59693	9.96310	276 45.4	0.56514	0.01917
40	1.15307	0.60116	9.59693	9.96310	279 15.4	0.56514	0.01918
50	1.06885	0.59695	9.59692	9.96310	281 45.4	0.56514	0.01918
19 0	−0.98463	−0.59275	+9.59692	+9.96311	284 15.4	+0.56515	+0.01919
10	0.90040	0.58855	9.59691	9.96311	286 45.4	0.56515	0.01919
20	0.81617	0.58436	9.59691	9.96311	289 15.4	0.56515	0.01919
30	0.73194	0.58018	9.59690	9.96311	291 45.4	0.56516	0.01919
40	0.64771	0.57600	9.59689	9.96311	294 15.3	0.56516	0.01919
50	0.56348	0.57183	9.59689	9.96311	296 45.3	0.56516	0.01919
20 0	−0.47925	−0.56767	+9.59688	+9.96311	299 15.3	+0.56516	+0.01919
10	0.39502	0.56351	9.59687	9.96311	301 45.3	0.56516	0.01919
20	0.31078	0.55936	9.59687	9.96311	304 15.3	0.56516	0.01919
30	0.22654	0.55522	9.59686	9.96312	306 45.3	0.56516	0.01919
40	0.14230	0.55108	9.59686	9.96312	309 15.3	0.56516	0.01918
50	−0.05806	0.54695	9.59685	9.96312	311 45.3	0.56515	0.01918
21 0	+0.02618	−0.54283	+9.59684	+9.96312	314 15.3	+0.56515	+0.01918
10	0.11043	0.53872	9.59684	9.96312	316 45.3	0.56515	0.01917
20	0.19468	0.53461	9.59683	9.96312	319 15.3	0.56514	0.01917
30	0.27892	0.53051	9.59683	9.96312	321 45.3	0.56514	0.01916
40	0.36316	0.52642	9.59682	9.96312	324 15.2	0.56513	0.01916
50	0.44740	0.52233	9.59682	9.96312	326 45.2	0.56513	0.01915
22 0	+0.53164	−0.51825	+9.59681	+9.96313	329 15.2	+0.56512	+0.01915
10	0.61588	0.51418	9.59681	9.96313	331 45.2	0.56512	0.01914
20	0.70012	0.51012	9.59680	9.96313	334 15.2	0.56511	0.01913
30	0.78436	0.50606	9.59679	9.96313	336 45.2	0.56510	0.01912
40	0.86860	0.50201	9.59678	9.96313	339 15.2	0.56509	0.01912
50	0.95284	0.49797	9.59678	9.96313	341 45.2	0.56508	0.01911
23 0	+1.03707	−0.49394	+9.59677	+9.96313	344 15.2	+0.56507	+0.01910
10	1.12130	0.48992	9.59677	9.96313	346 45.2	0.56506	0.01909
20	1.20554	0.48590	9.59676	9.96314	349 15.2	0.56505	0.01908
30	1.28977	0.48189	9.59675	9.96314	351 45.2	0.56504	0.01907
40	1.37400	0.47788	9.59675	9.96314	354 15.1	0.56503	0.01906
50	1.45823	0.47388	9.59674	9.96314	356 45.1	0.56502	0.01905
24 0	+1.54246	−0.46988	+9.59673	+9.96314	359 15.1	+0.56500	+0.01903

Greenwich Mean Time.	Log Δ x for 1 Minute.	Log Δ y for 1 Minute.	Log Δ μ for 1 Minute.	Log Tangents of Angles of Cones—	
				Penumbra.	Shadow.
h m					
18 0	+7.9254	+6.6277	+1.1761	+7.66273	+7.66062
19 0	7.9254	6.6234	1.1761	7.66273	7.66061
20 0	7.9255	6.6191	1.1761	7.66273	7.66061
21 0	7.9255	6.6148	1.1761	7.66273	7.66061
22 0	7.9255	6.6100	1.1761	7.66273	7.66061
23 0	7.9255	6.6054	1.1761	7.66272	7.66061
24 0	+7.9254	+6.6010	+1.1761	+7.66272	+7.66061

PATH OF THE SHADOW DURING THE ANNULAR ECLIPSE OF THE SUN, 1889, JUNE 27.

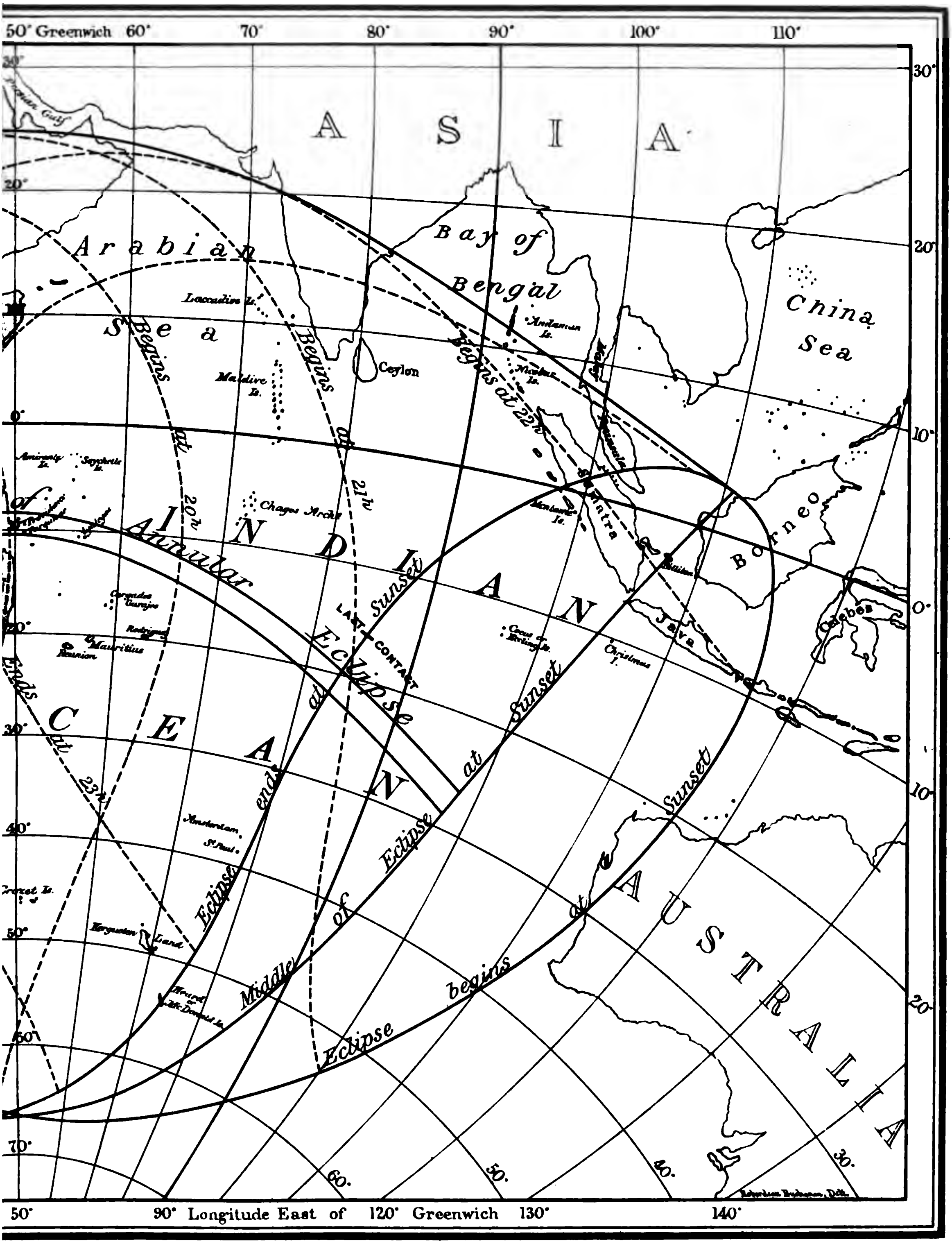
Greenwich Mean Time.	Northern Limit of Shadow Path.		Central Line.		Southern Limit of Shadow Path.		Duration of Annulus on Central Line.
	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	
	° ′	° ′	° ′	° ′	° ′	° ′	m s
Limits	−31 26.0	3 53.6 W.	−32 37.0	3 26.3 W.	−33 45.1	2 57.0 W.	
19h 25m	24 25.8	10 48.4 E.	26 7.4	9 59.9 E.	27 49.0	9 11.4 E.	5 24.4
30	−21 50.1	15 48.7	−23 15.0	15 30.3	−24 39.9	15 11.9	5 37.5
35	19 53.6	19 25.6	21 11.1	19 18.3	22 28.6	19 11.0	5 48.7
40	18 18.9	22 22.3	19 32.1	22 21.0	20 45.3	22 19.6	5 58.4
45	16 58.6	24 53.1	18 9.0	24 55.2	19 19.3	24 57.2	6 7.6
50	15 49.0	27 5.2	16 57.3	27 9.5	18 5.6	27 13.7	6 16.4
55	14 48.0	29 4.4	15 54.8	29 10.1	17 1.6	29 15.9	6 24.5
20 0	−13 53.8	30 53.8	−14 59.4	31 0.4	−16 5.1	31 7.1	6 32.2
5	13 5.6	32 34.8	14 10.3	32 42.0	15 15.1	32 49.3	6 39.3
10	12 22.4	34 9.5	13 26.5	34 17.0	14 30.6	34 24.6	6 46.0
15	11 43.9	35 39.2	12 47.5	35 46.9	13 51.1	35 54.6	6 52.3
20	11 9.5	37 4.7	12 12.8	37 12.4	13 16.0	37 20.1	6 58.2
25	10 39.1	38 26.8	11 42.0	38 34.4	12 45.0	38 42.0	7 3.6
30	−10 12.2	39 46.1	−11 15.0	39 53.5	−12 17.7	40 0.9	7 8.4
35	9 48.5	41 3.3	10 51.3	41 10.4	11 53.9	41 17.5	7 12.5
40	9 28.3	42 18.7	10 30.9	42 25.5	11 33.5	42 32.2	7 16.0
45	9 11.1	43 32.8	10 13.7	43 39.2	11 16.2	43 45.5	7 18.8
50	8 57.0	44 46.0	9 59.6	44 52.0	11 2.1	44 57.9	7 20.9
55	8 46.0	45 58.4	9 48.6	46 3.9	10 51.2	46 9.3	7 22.4
21 0	− 8 37.9	47 11.0	− 9 40.6	47 16.0	−10 43.3	47 21.0	7 23.2
5	8 32.5	48 23.5	9 35.3	48 28.0	10 38.1	48 32.6	7 23.0
10	8 30.0	49 36.4	9 33.0	49 40.5	10 36.0	49 44.5	7 22.1
15	8 30.6	50 50.1	9 33.8	50 53.7	10 36.9	50 57.3	7 20.4
20	8 34.3	52 4.9	9 37.6	52 8.0	10 40.9	52 11.1	7 17.9
25	8 41.0	53 21.1	9 44.6	53 23.8	10 48.1	53 26.5	7 14.8
30	− 8 51.0	54 39.2	− 9 54.8	54 41.5	−10 58.6	54 43.9	7 11.0
35	9 4.4	55 59.6	10 8.5	56 1.7	11 12.6	56 3.8	7 6.6
40	9 21.3	57 22.9	10 25.8	57 24.8	11 30.2	57 26.7	7 1.5
45	9 41.8	58 49.8	10 46.8	58 51.5	11 51.8	58 53.3	6 55.7
50	10 6.5	60 20.9	11 12.1	60 22.7	12 17.7	60 24.4	6 49.3
55	10 35.9	61 57.2	11 42.2	61 59.2	12 48.5	62 1.1	6 42.4
22 0	−11 10.2	63 39.8	−12 17.4	63 42.3	−13 24.6	63 44.7	6 35.1
5	11 50.1	65 30.5	12 58.5	65 33.8	14 6.9	65 37.0	6 27.1
10	12 36.8	67 31.1	13 46.5	67 35.6	14 56.2	67 40.0	6 18.6
15	13 31.7	69 45.0	14 43.2	69 51.3	15 54.8	69 57.6	6 9.7
20	14 36.8	72 16.3	15 51.0	72 26.0	17 5.2	72 35.7	6 0.0
25	15 55.7	75 13.1	17 13.8	75 28.3	18 31.9	75 43.5	5 49.7
30	−17 35.3	78 50.5	−19 0.0	79 16.2	−20 24.6	79 41.9	5 38.3
35	19 51.4	83 43.8	21 31.5	84 37.5	23 11.6	85 31.2	5 24.4
Limits	−26 26.1	98 15.7 E.	−27 37.4	97 52.6 E.	−28 46.5	97 27.9 E.	

ANNULAR ECLIPSE OF JUN



Note.–*The hours of beginning and ending are exp*

· JUNE 27TH 1889.



expressed in Greenwich Mean Time.

BESSELIAN ELEMENTS OF THE TOTAL ECLIPSE OF THE SUN, 1889, DECEMBER 21—2.

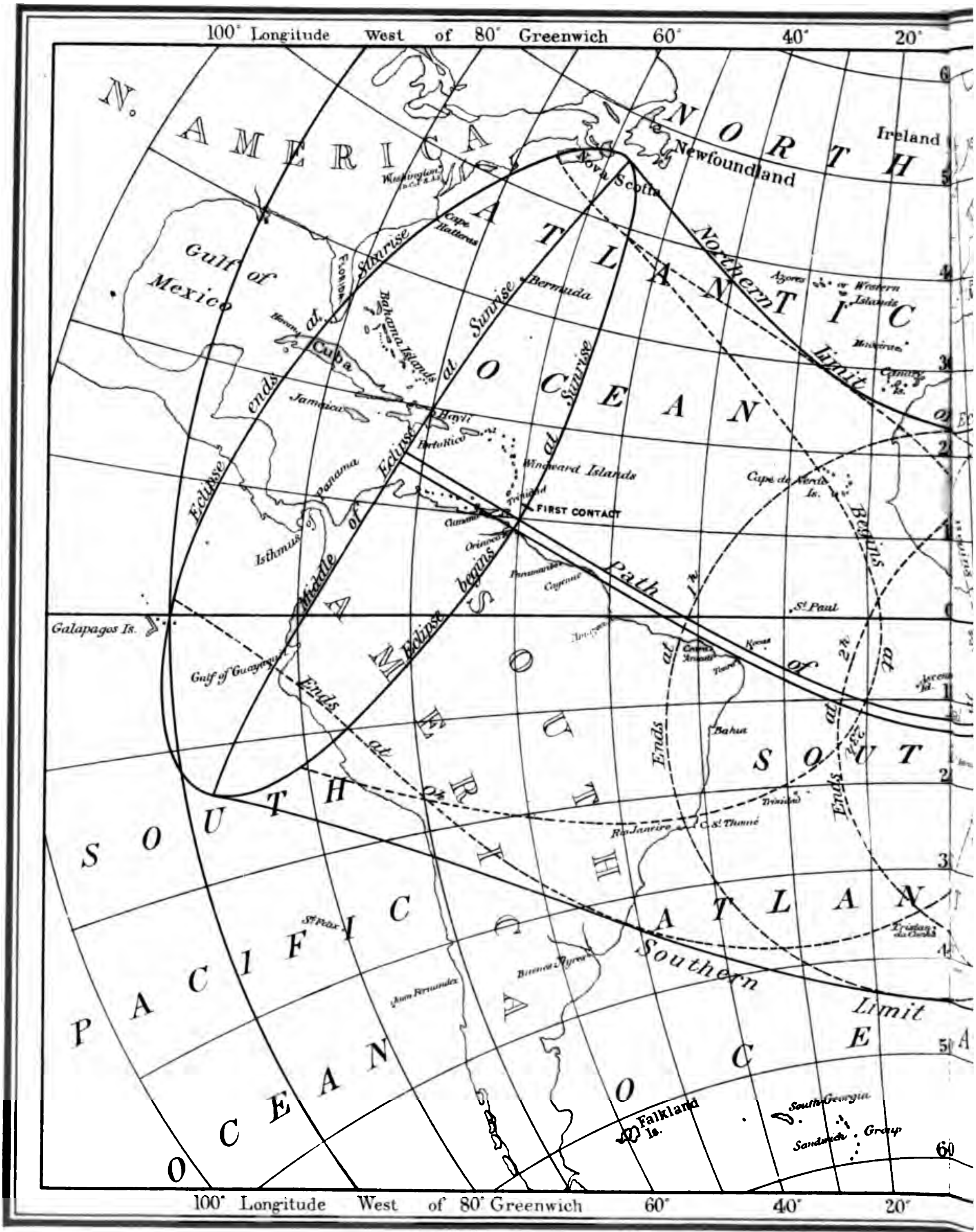
Greenwich Mean Time.	Co-ordinates of Axis of Shadow On Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra and Shadow On Fundamental Plane.	
	x	*y*	Log sin *d*	Log cos *d*	*μ*	*l*	*l′*
h m					° ′		
22 10	−1.56788	+0.33530	−9.59986	+9.96256	332 45.5	+0.53883	−0.00700
20	1.47144	0.32624	9.59986	9.96256	335 15.5	0.53884	0.00700
30	1.37499	0.31719	9.59986	9.96256	337 45.4	0.53884	0.00699
40	1.27853	0.30815	9.59986	9.96256	340 15.4	0.53885	0.00699
50	1.18206	0.29913	9.59985	9.96256	342 45.4	0.53885	0.00698
23 0	−1.08559	+0.29012	−9.59985	+9.96256	345 15.3	+0.53886	−0.00698
10	0.98911	0.28112	9.59985	9.96256	347 45.3	0.53886	0.00698
20	0.89263	0.27212	9.59985	9.96256	350 15.3	0.53886	0.00698
30	0.79614	0.26313	9.59985	9.96256	352 45.2	0.53886	0.00698
40	0.69965	0.25415	9.59985	9.96256	355 15.2	0.53886	0.00698
50	0.60316	0.24518	9.59985	9.96256	357 45.1	0.53886	0.00698
0 0	−0.50667	+0.23622	−9.59984	+9.96256	0 15.1	+0.53886	−0.00698
10	0.41018	0.22727	9.59984	9.96256	2 45.1	0.53886	0.00698
20	0.31368	0.21833	9.59984	9.96256	5 15.0	0.53885	0.00699
30	0.21718	0.20940	9.59984	9.96256	7 45.0	0.53885	0.00699
40	0.12068	0.20047	9.59984	9.96256	10 15.0	0.53885	0.00699
50	−0.02418	0.19155	9.59884	9.96256	12 44.9	0.53884	0.00700
1 0	+0.07232	+0.18264	−9.59984	+9.96256	15 14.9	+0.53884	−0.00700
10	0.16882	0.17374	9.59983	9.96256	17 44.8	0.53883	0.00701
20	0.26532	0.16485	9.59983	9.96256	20 14.8	0.53883	0.00701
30	0.36182	0.15597	9.59983	9.96256	22 44.8	0.53882	0.00702
40	0.45832	0.14711	9.59983	9.96256	25 14.7	0.53881	0.00703
50	0.55483	0.13826	9.59983	9.96256	27 44.7	0.53880	0.00704
2 0	+0.65134	+0.12942	−9.59983	+9.96256	30 14.7	+0.53879	−0.00705
10	0.74785	0.12059	9.59983	9.96256	32 44.6	0.53878	0.00706
20	0.84436	0.11177	9.59982	9.96256	35 14.6	0.53877	0.00707
30	0.94086	0.10295	9.59982	9.96256	37 44.6	0.53876	0.00708
40	1.03736	0.09414	9.59982	9.96256	40 14.5	0.53875	0.00709
50	1.13386	0.08534	9.59982	9.96256	42 44.5	0.53874	0.00710
3 0	+1.23036	+0.07655	−9.59982	+9.96256	45 14.4	+0.53872	−0.00712
10	1.32685	0.06778	9.59982	9.96256	47 44.4	0.53871	0.00713
20	1.42334	0.05902	9.59982	9.96256	50 14.4	0.53869	0.00715
30	1 51983	0.05027	9.59981	9.96256	52 44.3	0.53868	0.00716
40	+1 61632	+0.04152	−9.59981	+9.96256	55 14.3	+0.53866	−0.00718

Greenwich Mean Time.	Log Δ *x* for 1 Minute.	Log Δ *y* for 1 Minute.	Log Δ *μ* for 1 Minute.	Log Tangents of Angles of Cones—	
				Penumbra.	Shadow.
h m					
22 0	+7.9843	−6.9575	+1.1760	+7.67706	+7.67495
23 0	7.9844	6.9549	1.1760	7.67706	7.67495
0 0	7.9845	6.9521	1.1760	7.67706	7.67495
1 0	7.9845	6.9494	1.1760	7.67706	7.67495
2 0	7.9845	6.9465	1.1760	7.67706	7.67495
3 0	7.9845	6.9436	1.1760	7.67706	7.67495
4 0	+7.9844	−6.9405	+1.1760	+7.67706	+7.67495

PATH OF THE SHADOW DURING THE TOTAL ECLIPSE OF THE SUN, 1889, DECEMBER 21—2.

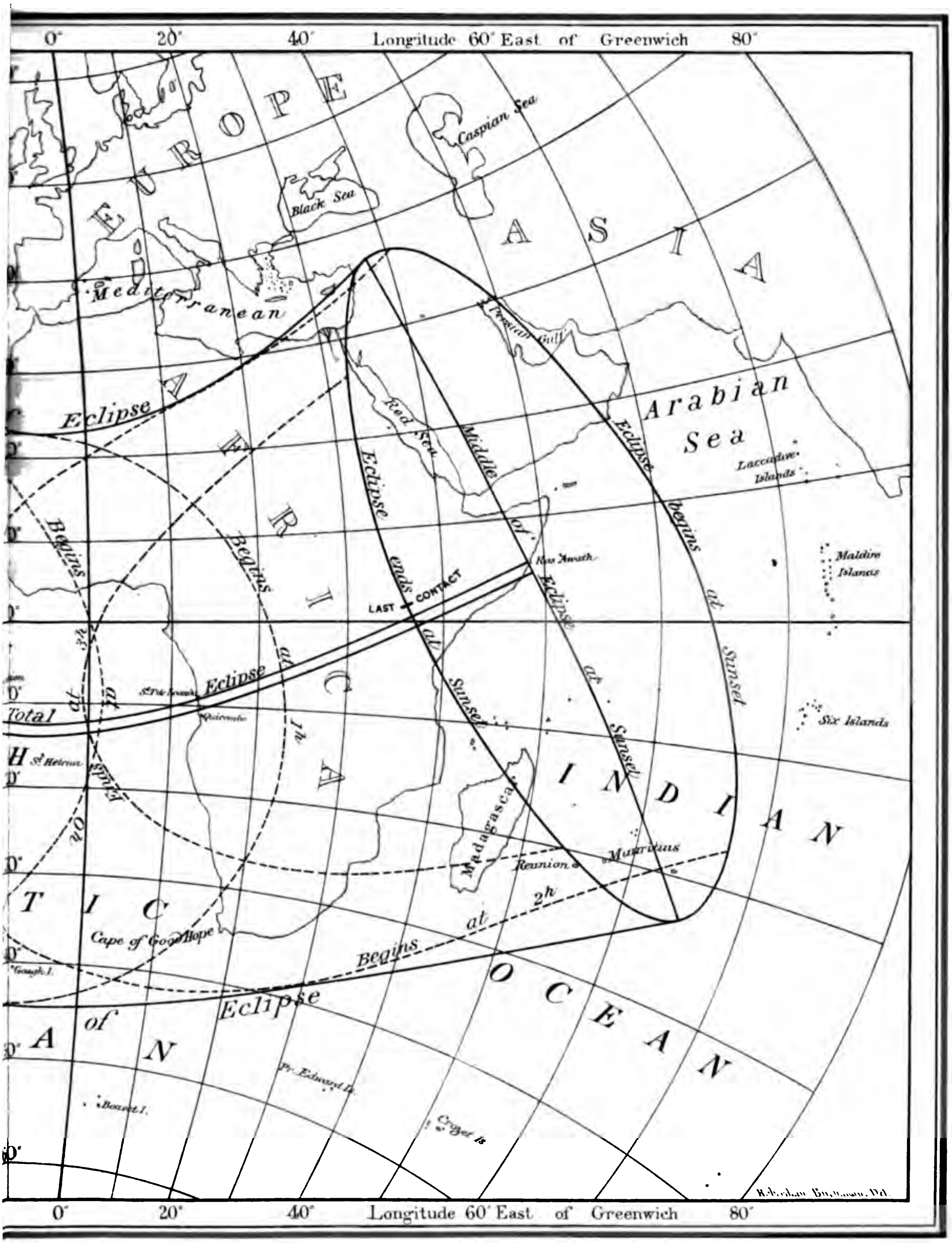
Greenwich Mean Time.	Northern Limit of Shadow Path.		Central Line.		Southern Limit of Shadow Path.		Duration of Totality on Central Line.
	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	
	° ′	° ′	° ′	° ′	° ′	° ′	m s
Limits	+15 13.1	71 43.1 W.	+14 52.8	71 53.0 W.	+14 28.4	72 3.8 W.	
23h 15m	10 54.0	62 18.9	10 30.5	62 31.6	10 7.0	62 44.7	1 46.8
20	6 34.7	53 52.4	6 8.8	54 7.0	5 42.9	54 22.1	2 8.2
25	3 58.0	49 1.3	3 30.6	49 16.6	3 3.1	49 32.3	2 22.8
30	+ 1 53.6	45 16.9	+ 1 24.8	45 32.6	+ 0 56.1	45 48.6	2 35.3
35	+ 0 9.0	42 8.8	− 0 20.9	42 24.6	− 0 50.8	42 40.7	2 46.5
40	− 1 21.9	39 25.1	1 52.9	39 40.8	2 23.8	39 57.0	2 56.8
45	2 42.2	36 58.2	3 14.2	37 13.9	3 46.1	37 30.0	3 6.3
50	3 54.4	34 43.1	4 27.3	34 58.8	5 0.3	35 14.4	3 15.2
55	4 59.3	32 37.9	5 33.1	32 53.2	6 6.9	33 8.6	3 23.5
0 0	− 5 58.2	30 40.0	− 6 32.8	30 54.9	− 7 7.5	31 9.9	3 31.2
5	6 51.7	28 47.8	7 27.1	29 2.3	8 2.5	29 16.7	3 38.3
10	7 40.4	27 0.2	8 16.6	27 14.1	8 52.7	27 28.0	3 44.9
15	8 24.7	25 16.5	9 1.5	25 29.7	9 38.3	25 43.0	3 50.9
20	9 4.7	23 35.7	9 42.1	23 48.3	10 19.6	24 0.8	3 56.3
25	9 40.9	21 57.2	10 18.9	22 9.0	10 57.0	22 20.8	4 1.0
30	−10 13.4	20 20.5	−10 52.0	20 31.5	−11 30.5	20 42.5	4 5.0
35	10 42.3	18 45.1	11 21.4	18 55.2	12 0.4	19 5.3	4 8.5
40	11 7.8	17 10.6	11 47.3	17 19.8	12 26.8	17 29.0	4 11.3
45	11 29.9	15 36.6	12 9.8	15 44.8	12 49.6	15 53.0	4 13.3
50	11 48.7	14 2.9	12 28.8	14 10.0	13 8.9	14 17.2	4 14.6
55	12 4.1	12 28.9	12 44.4	12 35.0	13 24.7	12 41.2	4 15.1
1 0	−12 16.3	10 54.5	−12 56.7	10 59.6	−13 37.2	11 4.6	4 14.9
5	12 25.2	9 19.3	13 5.7	9 23.3	13 46.2	9 27.2	4 14.1
10	12 30.7	7 43.0	13 11.2	7 45.8	13 51.7	7 48.6	4 12.6
15	12 32.7	6 5.2	13 13.1	6 6.9	13 53.6	6 8.6	4 10.2
20	12 31.2	4 25.6	13 11.4	4 26.1	13 51.8	4 26.7	4 7.0
25	12 26.0	2 43.7	13 6.1	2 43.1	13 46.2	2 42.5	4 3.1
30	−12 17.1	0 59.1 W.	−12 56.8	0 57.4 W.	−13 36.6	0 55.7 W.	3 58.6
35	12 4.1	0 48.8 E.	12 43.4	0 51.6 E.	13 22.7	0 54.4 E.	3 53.3
40	11 46.7	2 40.5	12 25.5	2 44.4	13 4.3	2 48.2	3 47.4
45	11 24.7	4 36.9	12 3.0	4 41.8	12 41.2	4 46.6	3 40.8
50	10 57.7	6 39.1	11 35.2	6 44.9	12 12.8	6 50.8	3 33.5
55	10 24.7	8 48.7	11 1.5	8 55.4	11 38.2	9 2.2	3 25.5
2 0	− 9 45.5	11 6.4	−10 21.4	11 14.0	−10 57.4	11 21.7	3 16.8
5	8 59.0	13 34.2	9 34.0	13 42.7	10 8.9	13 51.1	3 7.6
10	8 4.1	16 14.7	8 38.0	16 24.0	9 11.8	16 33.2	2 57.7
15	6 57.5	19 15.2	7 30.2	19 25.0	8 2.8	19 34.8	2 46.8
20	5 36.1	22 42.3	6 7.4	22 52.6	6 38.6	23 2.9	2 34.9
25	3 52.7	26 51.7	4 22.4	27 2.3	4 52.0	27 13.0	2 21.6
30	− 1 30.1	32 21.9	− 1 57.7	32 32.6	− 2 25.3	32 43.3	2 5.6
35	+ 3 6.6	42 49.2	+ 2 42.0	42 58.2	+ 2 17.5	43 7.3	1 42.7
Limits	+ 5 34.1	48 25.8 E.	+ 5 11.2	48 35.6 E.	+ 4 48.3	48 45.5 E.	

TOTAL ECLIPSE OF DEC



NOTE.—*The hours of beginning and endin*

EMBER 21ST & 22ND 1889.



ding are expressed in Greenwich Mean Time.

WASHINGTON MEAN TIME.

PHASES OF THE MOON.

New Moon.				First Quarter.				Full Moon.				Last Quarter.			
	d	h	m		d	h	m		d	h	m		d	h	m
January	1	3	59.9	January	8	7	32.4	January	16	12	28.6	January	23	22	49.0
January	30	16	1.7	February	7	3	49.8	February	15	5	9.8	February	22	6	46.9
March	1	4	52.6	March	9	0	51.2	March	16	18	39.0	March	23	13	46.2
March	30	18	29.2	April	7	20	38.8	April	15	5	10.4	April	21	20	47.6
April	29	8	56.7	May	7	13	34.2	May	14	13	34.0	May	21	4	44.9
May	29	0	11.4	June	6	2	53.3	June	12	20	50.0	June	19	14	27.8
June	27	15	45.4	July	5	12	50.5	July	12	3	53.5	July	19	2	36.7
July	27	6	52.3	August	3	20	18.7	August	10	11	34.5	August	17	17	43.4
August	25	20	51.8	September	2	2	26.4	September	8	20	44.4	September	16	11	40.5
September	24	9	33.5	October	1	8	24.9	October	8	8	17.4	October	16	7	29.3
October	23	21	17.7	October	30	15	22.3	November	6	22	57.0	November	15	3	27.7
November	22	8	35.4	November	29	0	20.5	December	6	16	44.2	December	14	21	50.1
December	21	19	44.2	December	28	12	8.3								

PERIGEE, APOGEE, AND GREATEST LIBRATION.

Perigee.			Apogee.			Greatest Libration.									
	d	h		d	h		d	h	m			d	h	m	
January	28	2.1	January	12	0.3	January	5	16	44	W.	January	20	14	52	E.
February	23	20.6	February	8	19.6	February	2	19	18	W.	February	15	17	37	E.
March	20	19.6	March	8	16.2	March	2	9	31	W.	March	14	18	50	E.
April	17	8.4	April	5	11.4	March	29	0	22	W.	April	11	13	43	E.
May	15	13.7	May	3	3.4	April	24	9	33	W.	May	9	16	24	E.
June	12	22.9	May	30	12.9	May	21	23	14	W.	June	6	21	31	E.
July	11	8.4	June	26	15.5	June	19	1	26	W.	July	5	0	42	E.
August	8	14.3	July	23	22.6	July	17	6	24	W.	August	1	17	35	E.
September	5	8.1	August	20	13.4	August	14	9	39	W.	August	28	9	20	E.
September	30	23.1	September	17	7.6	September	11	6	16	W.	September	23	19	21	E.
October	27	0.0	October	15	3.6	October	8	12	45	W.	October	21	4	21	E.
November	23	22.4	November	11	23.3	November	3	19	12	W.	November	18	4	3	E.
December	22	8.3	December	9	15.3	November	30	14	28	W.	December	16	10	50	E.
						December	28	12	56	W.					

FORMULÆ FOR THE LIBRATION OF THE MOON.

Put I, the inclination of the moon's equator to the ecliptic ($= 1^\circ\ 28'.8$),

Ω, the mean longitude of the moon's ascending node, (see page 278), or the mean longitude of the descending node of the moon's equator,

C, the angle at the centre of the moon's disk made by a lunar meridian with the circle of declination, counted from north to east on the apparent disk,

λ, β, α', δ', the apparent longitude, latitude, right ascension, and declination of the moon, corrected for parallax,

λ', the selenocentric longitude of the earth, counted on the moon's equator from its descending node, Ω,

i, Δ, Ω', ☾, the quantities defined on page 276, where their values for the year are given.

The moon's libration in longitude and latitude may then be found, for any time, by means of the following formulæ, in connection with the tables given on pages 276 and 277: —

$$\left.\begin{aligned} \Delta\lambda &= -\,0'.57 \sin 2\,(\Omega - \lambda) \\ a &= \sin I \cos(\Omega - \lambda) \\ \tan B &= \tan I \sin(\Omega - \lambda) \\ \lambda' &= \lambda + \Delta\lambda + a\,b \end{aligned}\right\} \textit{See table, page 277.}$$

$$\text{The libration in latitude} = b = B - \beta$$

$$\text{The libration in longitude} = l = \lambda' - \text{☾}$$

$$\sin C = \sin i \frac{\cos(\lambda' + \Delta - \Omega)}{\cos \delta'} = -\sin i \frac{\cos(\alpha' - \Omega)}{\cos b}$$

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"	° '	d h m	h m				°	°
				NEW	*MOON.*						
19 Capricorni	6	-2.31	- 6.1	-18 20.7	**3** 1 1.9	- 0 52.4	-1.2010	0.5923	+0.1009	-52	-90
20 Capricorni	6½	2.30	6.6	19 28.0	2 56.6	+ 0 57.8	+0.1412	0.5924	0.1136	+33	-30
η Capricorni	5	2.29	7.0	20 17.7	4 52.3	+ 2 49.0	+1.1980	0.5901	0.1173	+70	+41
30 Capricorni	5½	-2.22	- 7.5	-18 27.1	10 25.2	+ 8 9.3	+0.0185	0.5857	+0.1278	+27	-37
31 Capricorni	6½	2.23	7.4	17 55.8	10 33.1	+ 8 16.8	-0.4923	0.5857	0.1278	0	-71
ι Capricorni	4½	2.20	7.5	17 18.5	12 12.1	+ 9 52.1	-0.9086	0.5841	0.1316	-24	-90
γ Capricorni	3½	2.12	8.4	17 9.9	19 38.5	- 6 58.1	-0.0270	0.5780	0.1448	+27	-40
δ Capricorni	2½	2.08	8.6	16 37.9	22 35.2	- 4 7.9	-0.1394	0.5751	0.1496	+22	-46
ι Aquarii	4½	-1.97	- 9.0	-14 24.7	**4** 6 58.3	+ 3 57.0	-1.1060	0.5684	+0.1620	-35	-90
39 Aquarii	6½	1.95	9.3	14 44.6	9 35.5	+ 6 28.6	-0.3355	0.5661	0.1656	+16	-54
45 Aquarii	6½	1.90	9.4	13 51.8	12 30.0	+ 9 16.9	-0.7546	0.5632	0.1694	-10	-90
50 Aquarii	6	1.88	9.7	14 5.8	14 55.0	+11 36.9	-0.1030	0.5605	0.1724	+26	-44
B. A. C. 7835	6½	1.84	9.7	13 29.2	17 24.7	- 9 58.6	-0.2978	0.5591	0.1756	+16	-56
70 Aquarii	6	-1.73	- 9.9	-11 8.7	**5** 1 50.3	- 1 50.2	-1.2110	0.5522	+0.1843	-41	-90
74 Aquarii	6	1.72	10.3	12 12.7	4 7.6	+ 0 22.6	+0.3205	0.5504	0.1864	+52	-20
ψ^1 Aquarii	4	1.57	10.3	9 41.7	14 38.6	+10 32.9	-0.2972	0.5433	0.1954	+19	-56
ψ^2 Aquarii	4	1.56	10.3	9 47.6	15 37.5	+11 29.9	-0.0018	0.5423	0.1960	+35	-28
ψ^3 Aquarii	4½	1.56	10.5	10 13.3	16 7.6	+11 59.0	+0.5454	0.5417	0.1963	+69	- 8
B. A. C. 8274	7	-1.38	-10.3	- 7 0.0	**6** 6 31.0	+ 1 55.1	+0.0406	0.5331	+0.2046	+38	-36
30 Piscium	4½	1.30	10.4	6 38.1	13 11.5	+ 8 23.2	+1.0270	0.5295	0.2067	+83	+21
33 Piscium	4½	1.28	10.4	6 19.9	14 53.3	+10 1.9	+1.0570	0.5279	0.2071	+84	+23
B. A. C. 17	6	1.25	10.3	5 52.0	17 23.7	-11 32.2	+1.0840	0.5265	0.2079	+84	+25
15 Ceti	6½	1.08	9.0	1 7.1	**7** 7 34.0	+ 2 12.7	-1.0360	0.5204	0.2100	-22	-90
20 Ceti	5	-1.00	- 9.5	- 1 45.0	15 18.9	+ 9 44.0	+1.2720	0.5176	+0.2097	+88	+43
26 Ceti	6	0.93	8.7	+ 0 46.2	20 56.9	- 8 47.9	-0.2707	0.5162	0.2092	+23	-54
29 Ceti	6½	0.90	8.5	1 24.6	23 8.1	- 6 40.3	-0.5053	0.5154	0.2086	+11	-70
33 Ceti	6	0.89	8.4	1 51.2	**8** 0 29.3	- 5 31.7	-0.7052	0.5156	0.2086	0	-68
35 Ceti	6½	0.88	8.4	1 53.0	1 31.5	- 4 21.3	-0.5225	0.5152	0.2083	+10	-71
f Piscium	5	-0.86	- 8.1	+ 3 1.7	4 17.6	- 1 40.0	-1.1920	0.5150	+0.2079	-35	-87
ν Piscium	4½	0.71	7.6	4 55.5	16 46.7	+10 27.5	-0.6921	0.5135	0.2038	+ 1	-85
64 Ceti	5½	0.56	6.6	8 2.9	**9** 8 38.1	+ 1 51.7	-0.9469	0.5131	0.1960	-15	-82
ξ^1 Ceti	4½	0.55	6.5	8 19.4	9 29.9	+ 2 42.0	-1.0790	0.5134	0.1954	-25	-82
ξ^2 Ceti	4½	0.46	6.7	7 57.6	17 31.9	+10 30.1	+0.8716	0.5134	0.1903	+90	+13
B. A. C. 830	6	-0.41	- 5.9	+10 15.9	**10** 1 4.0	- 6 10.7	-0.2574	0.5146	+0.1848	+24	-50
μ Ceti	4½	0.39	6.1	9 38.6	2 21.1	- 4 55.8	+0.6686	0.5156	0.1842	+86	+ 2
Lalande 5725	6	-0.29	5.2	12 45.6	13 34.1	+ 5 57.7	-0.7695	0.5177	0.1744	- 5	-77
B. A. C. 1272	6	0.00	4.3	17 2.5	**11** 21 4.6	-11 28.0	-0.5436	0.5278	0.1394	+ 8	-62
δ^1 Tauri	4	+0.05	4.1	17 16.8	**12** 4 32.5	- 4 13.7	+0.1978	0.5304	0.1292	+50	-17
63 Tauri	6	+0.05	- 4.3	+16 30.9	4 47.9	- 3 58.9	+1.0700	0.5307	+0.1290	+90	+35
δ^2 Tauri	5½	0.05	4.2	17 11.0	5 7.3	- 3 40.0	+0.3790	0.5309	0.1286	+62	- 8
δ^3 Tauri	5	0.06	4.1	17 40.3	5 48.3	- 3 0.3	-0.0758	0.5309	0.1277	+34	-32
B. A. C. 1468	6½	0.15	3.9	18 31.8	16 2.7	+ 6 55.0	+0.2052	0.5358	0.1127	+50	-15
i Tauri	5½	0.17	4.0	18 38.9	18 32.0	+ 9 19.7	+0.3475	0.5367	0.1091	+60	- 8
l Tauri	5½	+0.22	- 3.7	+20 16.1	**13** 2 29.0	- 6 58.3	-0.6292	0.5392	+0.0961	+ 2	-64
ζ Tauri	3½	0.31	3.9	21 4.3	16 43.5	+ 6 48.7	-0.3131	0.5449	0.0721	+20	-39
χ^1 Orionis	4½	0.36	4.1	20 15.2	**14** 0 38.9	- 9 31.3	+1.1070	0.5484	0.0581	+90	+46
141 Tauri	6½	0.37	3.9	22 23.8	4 0.8	- 6 16.1	-1.0720	0.5489	0.0518	-30	-68
η Geminorum	3½	0.40	3.9	22 32.2	10 9.7	- 0 19.4	-0.9450	0.5516	0.0405	-19	-67
μ Geminorum	3	+0 41	- 3.9	+22 34.1	13 54.2	+ 3 17.7	-0.8405	0.5522	+0.0330	-12	-67
d Geminorum	6	0.46	4.1	21 53.4	**15** 3 5.8	- 7 57.2	+0.1741	0.5560	+0 0075	+48	- 6
44 Geminorum	6	0.48	4.2	22 48.1	9 22.6	- 1 53.1	-0.8210	0.5568	-0.0048	-10	-67
δ Geminor. *mult.*	3½	0.49	4.4	22 11.0	16 9.2	+ 4 39.7	-0.2226	0.5572	0.0184	+25	-28
63 Geminor. *mult.*	5½	0.50	4.5	21 40.2	19 38.3	+ 8 1.7	+0.2605	0.5576	0.0258	+54	- 4
79 Geminorum	6½	+0.50	- 4.6	+20 34.8	**16** 3 35.1	- 8 17.7	+1.1800	0.5582	-0.0418	+90	+55
μ^2 Cancri	5½	+0.49	- 4.6	+21 54.1	13 50.9	+ 1 37.2	-0.7898	0.5576	-0.0618	- 8	-68

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		s	″	° ′	d h m	h m				°	°
η Cancri	5½	+0.48	− 4.8	+20 48.9	17 1 14.9	−11 21.9	−0.4422	0.5565	−0.0837	+13	−49
83 Cancri	5½	0.41	4.7	18 10.5	22 33.2	+ 9 13.4	+0.2079	0.5529	0.1220	+50	−15
8 Leonis	5½	0.38	4.5	16 55.9	18 6 56.4	− 6 40.2	+0.4615	0.5518	0.1359	+68	− 4
37 Leonis	5½	0.29	4.0	14 16.8	19 1 32.3	+11 19.0	+0.5062	0.5473	0.1634	+71	− 5
ι Leonis	5½	0.24	4.0	14 42.2	8 52.6	− 5 35.1	−1.1780	0.5462	0.1728	−35	−75
l Leonis	5½	+0.19	− 3.3	+11 7.9	17 1.0	+ 2 17.5	+1.1710	0.5440	−0.1822	+90	+37
ω Virginis	6	+0.01	2.3	8 44.9	20 16 38.4	+ 1 9.5	−0.8915	0.5405	0.2039	−12	−81
μ Virginis	4	−0.02	1.9	7 9.1	20 12.8	+ 4 37.0	+0.0524	0.5399	0.2063	+41	−33
c Virginis	5½	0.16	0.6	3 55.9	21 12 52.6	− 3 14.9	−0.0991	0.5401	0.2154	+32	−43
B. A. C. 4254	6	0.23	− 0.1	+ 2 28.0	21 32.4	+ 5 8.3	−0.4506	0.5408	0.2183	+14	−66
80 Virginis	6	−0.51	+ 2.9	− 4 49.8	23 0 41.9	+ 7 25.2	+1.1390	0.5463	−0.2183	+85	+29
88 Virginis	6½	0.58	3.4	6 17.0	6 40.0	−10 48.5	+1.3310	0.5480	0.2162	+84	+53
ξ^1 Libræ	6	0.92	5.2	11 26.6	24 12 39.2	− 5 50.3	+0.3655	0.5620	0.1960	+56	−18
ξ^2 Libræ	5½	0.95	4.9	10 57.6	13 42.7	− 4 48.9	−0.3317	0.5628	0.1950	+16	−58
17 Libræ	7	0.95	4.8	10 42.4	14 22.5	− 4 10.5	−0.7175	0.5636	0.1941	− 3	−90
18 Libræ	6½	−0.96	+ 4.7	−10 41.8	14 39.5	− 3 54.1	−0.7818	0.5635	−0.1940	− 9	−90
γ Libræ	4½	1.16	5.7	14 25.0	25 6 27.8	+11 20.3	+0.0640	0.5736	0.1746	+35	−34
θ Libræ	4½	1.29	5.9	16 24.1	14 9.3	− 5 15.1	+0.7651	0.5777	0.1631	+74	+ 5
49 Libræ	6	1.30	5.7	16 12.2	16 54.7	− 2 35.9	+0.1225	0.5803	0.1589	+36	−31
χ Ophiuchi	4½	1.47	5.8	18 12.2	26 3 49.6	+ 7 54.4	+0.4966	0.5865	0.1396	+60	−13
24 Scorpii	5½	−1.53	+ 5.1	−17 31.5	9 43.2	−10 25.6	−0.9716	0.5899	−0.1282	−28	−90
29 Ophiuchi	6½	1.63	4.8	18 43.2	17 47.3	− 2 40.4	−0.7433	0.5946	0.1113	−16	−90
ξ Ophiuchi	5	1.75	4.6	20 59.5	27 1 15.9	+ 4 30.4	+0.7566	0.5991	0.0954	+69	+ 6
58 Ophiuchi	5½	1.84	4.1	21 37.6	9 59.1	−11 7.4	+0.6522	0.6032	0.0741	+64	− 1
B. A. C. 6098	6	1.91	3.2	20 44.0	17 22.9	− 4 1.6	−0.7221	0.6059	0.0558	−20	−90
μ Sagittarii	4	−1.95	+ 2.7	−21 5.2	21 38.2	+ 0 3.3	−0.5857	0.6074	−0.0453	−13	−81
14 Sagittarii	6	1.96	2.9	21 44.3	21 48.9	+ 0 13.5	+0.0579	0.6074	0.0447	+22	−34
15 Sagittarii	5½	1.96	2.7	20 45.6	22 11.8	+ 0 35.5	−0.9369	0.6074	0.0440	−34	−90
28 Sagittarii	5½	2.07	1.3	22 30.4	28 10 1.1	+11 56.0	+0.4692	0.6094	0.0132	+44	−11
ν^1 Sagittarii	5	2.09	1.0	22 52.8	12 59.3	− 9 13.4	+0.8170	0.6092	0.0050	+67	+10
ν^2 Sagittarii	5	−2.10	+ 1.0	−22 48.6	13 20.7	− 8 52.8	+0.7454	0.6092	−0.0047	+67	+ 5
ξ^2 Sagittarii	3½	2.08	0.5	21 15.1	14 22.2	− 7 53.9	−0.8153	0.6092	−0.0013	−30	−90
ο Sagittarii	3½	2.10	+ 0.3	21 54.2	17 0.0	− 5 22.6	−0.1581	0.6089	+0.0053	+ 7	−47
π Sagittarii	3	2.10	− 0.2	21 11.9	18 56.9	− 3 30.5	−0.8470	0.6089	0.0105	−32	−90
				NEW	*MOON.*						
δ Capricorni	2½	−2.06	− 8.2	−16 37.9	31 9 16.2	+ 8 21.3	−0.1187	0.5785	+0.1506	+23	−45
ι Aquarii	4½	−1.98	− 9.0	−14 24.7	17 34.5	− 7 38.6	−1.0790	0.5731	+0.1636	−33	−90
FEBRUARY.											
70 Aquarii	6	−1.85	−10.3	−11 8.7	1 12 10.3	+10 18.0	−1.1720	0.5594	+0.1871	−37	−90
74 Aquarii	6	1.84	10.6	12 12.7	14 25.2	−11 31.7	+0.3518	0.5575	0.1893	+54	−19
ψ^1 Aquarii	4	1.75	10.8	9 41.7	2 0 44.3	− 1 33.3	−0.2564	0.5496	0.1981	+21	−53
ψ^2 Aquarii	4	1.74	10.9	9 47.6	1 42.0	− 0 37.5	+0.0363	0.5487	0.1988	+37	−36
ψ^3 Aquarii	4½	−1.74	−11.0	−10 13.3	2 11.5	− 0 9.0	+0.5805	0.5486	+0.1991	+72	− 7
B. A. C. 8274	7	1.61	11.2	7 0.0	16 16.5	−10 31.3	+0.0856	0.5398	0.2073	+41	−33
30 Piscium	4½	1.56	11.3	6 38.1	22 47.9	− 4 12.3	+1.0650	0.5360	0.2099	+83	+24
33 Piscium	4½	1.55	11.3	6 19.9	3 0 27.4	− 2 36.0	+1.0960	0.5357	0.2106	+84	+26
B. A. C. 17	6	1.53	11.3	5 52.0	2 54.3	− 0 13.6	+1.1260	0.5344	0.2113	+84	+28
14 Ceti	6	−1.38	−10.6	− 1 7.1	15 27.9	+11 56.8	−1.2410	0.5280	+0.2132	−39	−90
15 Ceti	6½	1.37	10.7	1 7.1	16 45.0	−10 48.4	−0.9681	0.5272	0.2130	−17	−90
20 Ceti	5	1.31	11.0	− 1 45.1	4 0 19.3	− 3 27.7	+1.3230	0.5252	0.2130	+88	+50
26 Ceti	6	1.26	10.2	+ 0 46.1	5 49.7	+ 1 53.0	−0.2039	0.5229	0.2123	+27	−50
29 Ceti	6½	1.24	10.0	1 24.5	7 58.0	+ 3 57.3	−0.4382	0.5220	0.2118	+15	−65
33 Ceti	6	−1.23	− 9.9	+ 1 51.1	9 17.4	+ 5 14.4	−0.6350	0.5216	+0.2113	+ 4	−81
35 Ceti	6½	−1.22	−10.0	+ 1 52.9	10 18.3	+ 6 13.4	−0.4534	0.5218	+0.2113	+14	−66

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				c	c
f Piscium	5	-1.19	-9.8	+ 3 1.6	4 13 1.1	+ 8 51.4	-1.1110	0.5201	+0.2103	-27	-87
ν Piscium	4½	1.08	9.3	4 55.4	5 1 15.2	- 3 16.1	-0.6137	0.5188	0.2063	+ 5	-78
64 Ceti	5½	0.92	8.3	8 2.9	16 49.8	+11 51.2	-0.8674	0.5171	0.1978	-10	-82
ξ^1 Ceti	4½	0.91	8.3	8 19.4	17 40.8	-11 19.2	-0.9982	0.5169	0.1972	-19	-82
ξ^2 Ceti	4½	0.84	8.3	7 57.6	6 1 35.8	- 3 38.2	+0.9399	0.5180	0.1920	+90	+17
B. A. C. 830	6	-0.77	-7.5	+10 15.9	9 2.3	+ 3 35.4	-0.1774	0.5180	+0.1861	+28	-45
μ Ceti	4½	0.76	7.7	9 38.6	10 18.4	+ 4 49.2	+0.7369	0.5180	0.1848	+90	+ 6
Lalande 5725	6	0.65	6.5	12 45.6	21 24.5	- 8 24.2	-0.6863	0.5196	0.1749	0	-76
B. A. C. 1272	6	0.33	4.8	17 2.5	8 4 45.2	- 1 59.7	-0.4669	0.5276	0.1393	+12	-57
δ^1 Tauri	4	0.27	4.6	17 16.8	12 12.6	+ 5 14.1	+0.2713	0.5297	0.1292	+54	-14
63 Tauri	6	-0.26	-4.8	+16 30.9	12 27.9	+ 5 28.8	+1.1495	0.5298	+0.1286	+90	+41
δ^2 Tauri	5½	0.26	4.6	17 11.0	12 47.3	+ 5 47.7	+0.4521	0.5299	0.1282	+67	- 4
δ^3 Tauri	5	0.26	4.4	17 40.3	13 28.1	+ 6 27.2	-0.0037	0.5301	0.1272	+38	-28
ε Tauri	3½	0.23	4.1	18 55.9	14 59.6	+ 7 55.1	-1.2050	0.5304	0.1251	-41	-71
B. A. C. 1468	6½	0.16	4.2	18 31.8	23 42.8	- 7 37.1	+0.2749	0.5338	0.1122	+55	-11
i Tauri	5½	-0.14	-4.1	+18 38.9	9 2 12.2	- 5 12.4	+0.4189	0.5348	+0.1085	+65	- 4
l Tauri	5½	-0.05	3.6	20 16.1	10 9.9	+ 2 30.3	-0.5609	0.5378	0.0960	+ 6	-59
ζ Tauri	3½	+0.09	3.4	21 4.3	10 0 26.9	- 7 40.2	-0.2505	0.5430	0.0713	+24	-36
χ^1 Orionis	4½	0.17	3.6	20 15.2	8 23.6	+ 0 1.0	+1.1640	0.5457	0.0572	+90	+52
141 Tauri	6½	0.20	2.8	22 23.8	11 46.1	+ 3 16.9	-1.0190	0.5470	0.0512	-25	-68
η Geminorum	3½	+0.25	-2.9	+22 32.2	17 56.0	+ 9 14.6	-0.9003	0.5489	+0.0397	-16	-67
μ Geminorum	3	0.29	3.1	22 34.1	21 41.0	-11 7.8	-0.7891	0.5504	0.0325	- 8	-67
15 Geminorum	6½	0.30	3.5	20 51.3	23 57.8	- 8 55.5	+1.1650	0.5505	0.0282	+90	+54
d Geminorum	6	0.40	3.4	21 53.4	11 10 54.0	+ 1 38.7	+0.2158	0.5541	+0.0066	+51	- 4
44 Geminorum	6	0.45	3.3	22 48.1	17 11.1	+ 7 43.1	-0.7793	0.5555	-0.0060	- 8	-67
δ Geminor. *mult.*	3½	+0.49	-3.6	+22 11.0	23 57.7	- 9 43.9	-0.1894	0.5569	-0.0192	+27	-27
63 Geminor. *mult.*	5½	0.51	3.8	21 40.2	12 3 26.6	- 6 22.3	+0.2910	0.5569	0.0265	+56	- 2
79 Geminorum	6½	0.57	4.1	20 34.8	11 22.6	+ 1 17.6	+1.2030	0.5573	0.0421	+90	+57
84 Geminorum	6½	0.59	3.6	22 37.0	14 54.1	+ 4 41.9	-1.1700	0.5575	0.0494	-40	-67
7 Cancri	6½	0.60	3.9	22 22.8	19 49.1	+ 9 26.8	-1.1810	0.5588	0.0593	-41	-68
μ^2 Cancri	5½	+0.61	-4.0	+21 54.1	21 36.2	+11 10.3	-0.7703	0.5585	-0.0628	- 7	-68
B. A. C. 2788	6	0.65	4.2	21 5.8	13 3 19.3	- 7 18.4	-0.2900	0.5585	0.0739	+21	-38
η Cancri	5½	0.67	4.4	20 48.9	8 56.3	- 1 52.9	-0.4297	0.5585	0.0849	+14	-48
83 Cancri	5½	0.72	4.9	18 10.5	14 6 2.9	- 5 29.2	+0.1946	0.5573	0.1242	+50	-16
SATURN				17 6.7	7 27.7	- 4 7.3	+1.1530	0.5599	0.1273	+90	+43
8 Leonis	5½	+0.73	-5.2	+16 55.9	14 20.0	+ 2 31.1	+0.4369	0.5552	-0.1377	+66	- 5
37 Leonis	5½	0.72	5.4	14 16.8	15 8 39.5	- 3 46.2	+0.4621	0.5529	0.1656	+67	- 7
ω Virginis	6	0.61	5.0	8 44.8	16 23 3.6	+ 9 22.2	-0.9687	0.5471	0.2073	-17	-81
ν Virginis	4	0.60	5.0	7 9.0	17 2 34.0	-11 14.3	-0.0329	0.5464	0.2099	+36	-38
c Virginis	5½	0.50	4.3	3 55.8	18 55.8	+ 4 35.7	-0.2020	0.5459	0.2187	+27	-49
B. A. C. 4254	6	+0.46	-3.9	+ 2 27.9	18 3 27.2	-11 9.6	-0.5576	0.5454	-0.2211	+ 8	-74
80 Virginis	6	0.25	1.7	- 4 49.8	19 6 16.0	- 9 13.3	+1.0080	0.5529	0.2215	+85	+19
88 Virginis	6½	+0.20	-1.3	6 17.0	12 11.3	- 3 29.8	+1.2000	0.5546	0.2192	+84	+35
ξ^1 Libræ	6	-0.09	+0.6	11 26.7	20 18 7.6	+ 1 25.5	+0.2224	0.5614	0.1958	+46	-26
ξ^2 Libræ	5½	0.09	0.7	10 57.7	19 11.4	+ 2 27.0	-0.4787	0.5620	0.1947	+ 9	-68
17 Libræ	7	-0.10	+0.6	-10 42.5	19 51.3	+ 3 5.6	-0.8658	0.5623	-0.1941	-14	-90
18 Libræ	6½	0.10	0.6	10 41.9	20 8.5	+ 3 22.2	-0.9319	0.5624	0.1939	-18	-90
o^2 Libræ	6½	0.24	1.9	14 44.3	21 6 40.1	-10 28.3	+1.2050	0.5672	0.1812	+75	+38
γ Libræ	4½	0.30	1.8	14 25.1	12 4.5	- 5 15.6	-0.0812	0.5697	0.1735	+27	-43
η Libræ	6	0.35	2.0	15 19.1	15 44.2	- 1 43.7	+0.2099	0.5705	0.1684	+42	-26
θ Libræ	4½	-0.40	+2.4	-16 24.2	19 52.2	+ 2 15.1	+0.6244	0.5741	-0.1619	+70	- 3
49 Libræ	6	0.44	2.3	16 12.3	22 39.9	+ 4 56.8	-0.0219	0.5757	0.1576	+28	-39
χ Ophiuchi	4½	0.58	2.9	18 12.3	22 9 46.4	- 8 21.3	+0.3615	0.5805	0.1380	+48	-18
24 Scorpii	5½	0.67	2.5	17 31.6	15 47.4	- 2 34.2	-1.1210	0.5837	0.1267	-41	-90
29 Ophiuchi	6½	0.78	2.6	18 43.3	23 0 2.4	+ 5 22.2	-0.8837	0.5870	0.1096	-25	-90
ξ Ophiuchi	5	-0.89	+3.1	-20 59.6	7 42.4	-11 15.6	+0.6357	0.5903	-0.0931	+64	- 2
58 Ophiuchi	5½	-1.02	+2.8	-21 37.7	16 39.9	- 2 39.0	+0.5396	0.5936	-0.0726	+55	- 8

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

The Star's					At Conjunction in R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1889.0. Δα	Red'ns from 1889.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x	y′	N.	S.
		s	″	° ′	d h m	h m				°	
B. A. C. 6098	6	-1.12	+ 2.0	-20 44.1	24 0 16.3	+ 4 39.4	-0.8482	0.5961	-0.0547	-28	-90
P. xvii, 334	5½	1.14	2.6	22 50.3	0 44.8	+ 5 6.8	+1.2545	0.5962	0.0532	+67	+55
μ Sagittarii	4	1.19	1.7	21 5.2	4 39.3	+ 8 52.0	-0.7066	0.5970	0.0435	-20	-90
14 Sagittarii	6	1.19	2.0	21 44.3	4 50.4	+ 9 2.7	-0.0574	0.5970	0.0431	+15	-42
15 Sagittarii	5½	1.19	1.7	20 45.6	5 14.8	+ 9 26.1	-1.0640	0.5973	0.0424	-44	-90
JUPITER				-23 4.9	7 28.9	+11 34.9	+1.1980	0.5912	-0.0370	+67	+44
B. A. C. 6336	6	-1.28	+ 1.4	21 29.3	14 7.8	- 6 2.1	-0.6036	0.5981	0.0199	-16	-83
B. A. C. 6347	6	1.28	1.3	21 8.5	14 31.3	- 5 39.6	-0.9612	0.5984	0.0191	-38	-90
28 Sagittarii	5½	1.33	1.4	22 30.4	17 24.8	- 2 53.0	+0.3744	0.5985	0.0115	+37	-17
30 Sagittarii	6½	1.35	1.2	22 17.3	19 11.0	- 1 11.0	+0.1366	0.5985	0.0074	+23	-30
31 Sagittarii	6½	-1.36	+ 1.1	-22 3.0	19 41.6	- 0 41.6	-0.1079	0.5985	-0.0061	+10	-44
33 Sagittarii	6	1.36	0.9	21 29.7	20 26.0	+ 0 1.0	-0.6728	0.5985	0.0040	-22	-90
ν¹ Sagittarii	5	1.37	1.3	22 52.8	20 28.4	+ 0 3.3	+0.7285	0.5985	0.0040	+67	+ 4
ν² Sagittarii	5	1.37	1.2	22 48.6	20 50.6	+ 0 24.6	+0.6575	0.5985	0.0032	+59	0
B. A. C. 6448	6½	1.38	1.4	23 18.9	21 11.3	+ 0 44.5	+1.1650	0.5985	0.0020	+67	+40
ξ² Sagittarii	3½	-1.38	+ 0.7	-21 15.1	21 54.0	+ 1 25.5	-0.9224	0.5985	-0.0005	-37	-90
o Sagittarii	3½	1.42	0.6	21 54.2	25 0 36.6	+ 4 1.6	-0.2567	0.5993	+0.0067	+ 2	-54
π Sagittarii	3	1.44	+ 0.2	21 11.9	2 37.2	+ 5 57.4	-0.9510	0.5989	0.0115	-38	-90
50 Sagittarii	6	1.50	- 0.3	21 59.7	9 6.3	-11 48.9	-0.0186	0.5981	0.0279	+16	-39
4 Capricorni	6	1.68	2.2	22 9.1	26 5 37.4	+ 7 53.8	+1.2240	0.5926	0.0769	+68	+47
η Capricorni	5	-1.78	- 4.6	-20 17.7	27 0 32.7	+ 2 5.5	+1.1920	0.5838	+0.1180	+70	+40
30 Capricorni	5½	1.77	5.5	18 27.1	6 12.3	+ 7 32.5	+0.0103	0.5811	0.1291	+28	-37
ι Capricorni	4½	1.77	5.9	17 18.5	8 1.1	+ 9 17.2	-0.9615	0.5794	0.1327	-25	-90
γ Capricorni	3½	1.79	6.6	17 9.9	15 34.1	- 7 26.4	-0.0172	0.5761	0.1462	+28	-39
δ Capricorni	2½	-1.79	- 7.0	-16 37.9	18 32.3	- 4 34.7	-0.1248	0.5733	+0.1508	+23	-45
				NEW	*MOON.*						

MARCH.

Name.	Mag.	Δα	Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x	y′	N.	S.
14 Ceti	6	-1.57	-11.1	- 1 7.1	3 1 0.0	- 0 43.1	-1.1130	0.5316	+0.2160	-27	-90
15 Ceti	6½	1.56	11.1	- 1 7.1	2 16.3	+ 0 30.9	-0.8371	0.5309	0.2162	- 8	-99
26 Ceti	6	1.50	10.9	+ 0 46.1	15 13.0	-10 55.9	-0.0570	0.5276	0.2156	+35	-41
29 Ceti	6½	1.48	10.8	1 24.5	17 19.8	- 8 53.0	-0.2870	0.5265	0.2148	+22	-55
33 Ceti	6	1.48	10.8	1 51.1	18 38.5	- 7 36.6	-0.4795	0.5262	0.2145	+13	-68
35 Ceti	6½	-1.47	-10.8	+ 1 52.9	19 38.6	- 6 38.3	-0.2965	0.5262	+0.2145	+22	-56
f Piscium	5	1.45	10.5	3 1.6	22 19.3	- 4 2.5	-0.9502	0.5250	0.2137	-15	-87
ν Piscium	4½	1.38	10.3	4 55.4	4 10 23.9	+ 7 40.5	-0.4380	0.5226	0.2090	+15	-64
64 Ceti	5½	1.28	9.6	8 2.8	5 1 45.8	- 1 24.9	-0.6691	0.5217	0.2005	+ 2	-80
ξ¹ Ceti	4½	1.28	9.5	8 19.3	2 36.1	- 0 36.0	-0.8011	0.5213	0.1999	- 6	-82
ξ² Ceti	4½	-1.22	- 9.3	+ 7 57.6	10 24.7	+ 6 58.3	+1.1320	0.5216	+0.1942	+90	+32
B. A. C. 830	6	1.17	8.5	10 15.9	17 45.1	- 9 53.9	+0.0253	0.5224	0.1886	+39	-33
μ Ceti	4½	1.16	8.6	9 38.6	19 0.4	- 8 40.8	+0.9399	0.5224	0.1873	+90	+18
Lalande 5725	6	1.07	7.6	12 45.6	6 5 58.3	+ 1 57.4	-0.4718	0.5232	0.1768	+12	-62
B. A. C. 1272	6	0.80	5.7	17 2.5	7 13 1.7	+ 8 4.7	-0.2431	0.5293	0.1398	+25	-42
δ¹ Tauri	4	-0.74	- 5.3	+17 16.8	20 26.7	- 8 44.0	+0.4918	0.5308	+0.1293	+71	- 2
δ² Tauri	5½	0.73	5.4	17 11.0	21 1.2	- 8 10.6	+0.6722	0.5308	0.1285	+90	+ 9
δ³ Tauri	5	0.72	5.2	17 40.3	21 41.6	- 7 31.5	+0.2192	0.5308	0.1276	+51	-16
ε Tauri	3½	0.71	4.7	18 55.9	23 13.1	- 6 2.7	-0.9817	0.5314	0.1252	-20	-71
B. A. C. 1468	6½	0.63	4.5	18 31.8	8 7 54.6	+ 2 22.5	+0.4964	0.5344	0.1122	+71	+ 1
i Tauri	5½	-0.61	- 4.4	+18 38.9	10 23.8	+ 4 47.0	+0.6403	0.5354	+0.1084	+86	+ 9
l Tauri	5½	0.51	3.8	20 16.1	18 20.8	-11 31.0	-0.3433	0.5370	0.0954	+19	-44
ζ Tauri	3½	0.35	3.1	21 4.3	9 8 39.1	+ 2 19.9	-0.0386	0.5409	0.0711	+36	-24
141 Tauri	6½	0.24	2.6	22 23.9	20 0.9	-10 40.4	-0.8122	0.5451	0.0505	-10	-68
6 Geminorum	6½	0.19	2.4	22 55.9	10 0 59.8	- 5 51.4	-1.1730	0.5461	0.0410	-40	-67
η Geminorum	3½	-0.18	- 2.5	+22 32.3	2 12.7	- 4 40.9	-0.6912	0.5464	+0.0388	- 2	-65
μ Geminorum	3	-0.13	- 2.5	+22 34.2	5 59.0	- 1 2.0	-0.5928	0.5467	+0.0316	+ 4	-56

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
d Geminorum	6	+0.01	-2.5	+21 53.5	**10** 19 17.3	+11 49.8	+0.4030	0.5505	+0.0059	+64	+ 7
44 Geminorum	6	0.08	2.2	22 48.2	**11** 1 37.1	- 6 3.1	-0.6015	0.5518	-0.0068	+ 4	-54
δ Geminor. *mult.*	3½	0.16	2.5	22 11.1	8 26.9	+ 0 33.0	-0.0145	0.5531	0.0205	+37	-17
58 Geminorum	6½	0.17	2.2	23 9.4	9 57.8	+ 2 0.8	-1.1090	0.5531	0.0217	-34	-67
63 Geminor. *mult.*	5½	0.19	2.6	21 40.3	11 57.4	+ 3 56.3	+0.4627	0.5531	0.0275	+69	+ 8
μ² Cancri	5½	+0.38	-2.5	+21 54.2	**12** 6 15.0	- 2 23.0	-0.6256	0.5546	-0.0634	+ 2	-61
η Cancri	5½	0.48	3.0	20 48.9	17 39.6	+ 8 38.4	-0.2985	0.5549	0.0858	+21	-40
Saturn				17 40.7	**13** 12 51.8	+ 3 11.6	+1.0690	0.5569	0.1223	+90	+36
83 Cancri	5½	0.65	3.9	18 10.5	14 51.3	+ 5 7.0	+0.2936	0.5541	0.1249	+56	-12
8 Leonis	5½	0.70	4.3	16 55.9	23 8.8	-10 52.2	+0.5177	0.5541	0.1394	+73	- 1
37 Leonis	5½	+0.79	-5.0	+14 16.8	**14** 17 25.9	+ 6 48.1	+0.5070	0.5525	-0.1679	+71	- 5
i Leonis	5½	0.82	4.9	14 42.2	**15** 0 36.5	-10 15.7	-1.1750	0.5514	0.1774	-35	-75
l Leonis	5½	0.84	5.4	11 7.9	8 32.6	- 2 35.4	+1.1150	0.5514	0.1878	+90	+32
ν Virginis	4	0.88	5.8	+ 7 9.0	**16** 10 53.7	- 1 6.8	-0.0740	0.5508	0.2138	+34	-41
80 Virginis	6	0.80	4.6	- 4 49.9	**18** 13 28.5	- 0 13.2	+0.8429	0.5567	0.2248	+85	+ 8
ξ¹ Libræ	6	+0.61	-2.5	-11 26.7	**20** 0 26.7	+ 9 32.0	+0.0169	0.5685	-0.2006	+35	-37
ξ² Libræ	5½	0.60	2.4	10 57.7	1 29.0	+10 32.2	-0.6773	0.5690	0.1986	- 3	-88
γ Libræ	4½	0.45	1.1	14 25.1	18 0.5	+ 2 27.8	-0.3003	0.5757	0.1762	+15	-56
η Libræ	6	0.42	0.7	15 19.1	21 35.9	+ 5 55.3	-0.0185	0.5772	0.1708	+30	-39
θ Libræ	4½	0.38	0.3	16 24.2	**21** 1 39.5	+ 9 49.9	+0.3943	0.5786	0.1641	+53	-16
49 Libræ	6	+0.35	-0.3	-16 12.3	4 24.4	-11 31.3	-0.2499	0.5825	-0.1592	+16	-53
χ Ophiuchi	4½	0.24	+0.4	18 12.3	15 21.0	- 0 59.4	+0.1260	0.5847	0.1395	+34	-31
29 Ophiuchi	6½	+0.06	0.8	18 43.3	**22** 5 28.3	-11 24.6	-1.1230	0.5897	0.1101	-42	-90
ξ Ophiuchi	5	-0.03	1.6	20 59.6	13 5.4	- 4 5.3	+0.4006	0.5911	0.0929	+46	-16
58 Ophiuchi	5½	0.15	1.9	21 37.7	22 1.2	+ 4 29.6	+0.3018	0.5936	0.0722	+39	-21
B. A. C. 6098	6	-0.26	+1.5	-20 44.1	**23** 5 38.0	+11 48.5	-1.0840	0.5950	-0.0540	-45	-90
P. xvii, 334	5½	0.27	2.3	22 50.3	6 6.6	-11 44.0	+1.0220	0.5952	0.0529	+67	+25
μ Sagittarii	4	0.32	1.4	21 5.2	10 1.7	- 7 58.2	-0.9390	0.5948	0.0429	-34	-90
14 Sagittarii	6	0.32	1.8	21 44.3	10 12.8	- 7 47.6	-0.2872	0.5948	0.0426	+ 4	-56
Jupiter				22 58.5	18 49.5	+ 0 28.7	+0.6920	0.5912	0.0213	+64	+ 2
B. A. C. 6336	6	-0.45	+1.5	-21 29.3	19 33.2	+ 1 10.7	-0.8324	0.5948	-0.0195	-30	-90
B. A. C. 6347	6	0.45	1.4	21 8.5	19 57.1	+ 1 33.6	-1.1910	0.5950	0.0185	-58	-90
28 Sagittarii	5½	0.50	1.7	22 30.4	22 52.0	+ 4 21.6	+0.1525	0.5956	0.0110	+23	-29
30 Sagittarii	6½	0.52	1.6	22 17.3	**24** 0 39.1	+ 6 4.5	-0.0847	0.5950	0.0068	+11	-43
31 Sagittarii	6½	0.53	1.7	22 3.0	1 10.0	+ 6 34.1	-0.3306	0.5950	0.0051	- 3	-59
33 Sagittarii	6	-0.54	+1.3	-21 29.7	1 55.1	+ 7 17.5	-0.8982	0.5947	-0.0034	-35	-90
ν¹ Sagittarii	5	0.54	1.8	22 52.8	1 57.5	+ 7 19.8	+0.5101	0.5947	0.0032	+46	- 9
ν² Sagittarii	5	0.54	1.7	22 48.6	2 20.0	+ 7 41.4	+0.4371	0.5947	0.0025	+41	-13
B. A. C. 6448	6½	0.54	1.9	23 18.9	2 40.6	+ 8 1.2	+0.9491	0.5947	-0.0019	+67	+20
ξ² Sagittarii	3½	0.56	1.1	21 15.1	3 23.7	+ 8 42.5	-1.1490	0.5947	+0.0002	-55	-90
o Sagittarii	3½	-0.60	+1.2	-21 54.2	6 8.2	+11 20.7	-0.4771	0.5947	+0.0070	-11	-71
π Sagittarii	3	0.62	0.9	21 11.9	8 10.1	-10 42.3	-1.1750	0.5942	0.0120	-57	-90
50 Sagittarii	6	0.71	+0.9	21 59.7	14 44.4	- 4 23.4	-0.2313	0.5929	0.0284	+ 5	-53
4 Capricorni	6	0.98	-0.2	22 9.1	**25** 11 36.7	- 8 19.5	+1.0450	0.5856	0.0776	+68	+26
20 Capricorni	6½	1.14	2.1	19 27.9	**26** 4 55.1	+ 8 20.0	-0.0481	0.5775	0.1143	+23	-41
η Capricorni	5	-1.16	-2.0	-20 17.6	6 56.5	+10 16.9	+1.0410	0.5758	+0.1155	+70	+25
30 Capricorni	5½	1.22	2.9	18 27.0	12 43.8	- 8 8.4	-0.1445	0.5729	0.1292	+19	-47
31 Capricorni	6½	1.21	3.0	17 55.7	12 52.1	- 8 0.5	-0.6661	0.5727	0.1293	- 9	-89
ι Capricorni	4½	1.22	3.3	17 18.4	14 35.2	- 6 21.1	-1.0840	0.5714	0.1325	-36	-90
γ Capricorni	3½	1.28	3.8	17 9.9	22 18.5	+ 1 5.6	-0.1571	0.5679	0.1460	+21	-47
δ Capricorni	2½	-1.30	-4.2	-16 37.9	**27** 1 21.2	+ 4 1.8	-0.2557	0.5658	+0.1508	+16	-53
ι Aquarii	4½	1.35	5.4	14 24.6	9 59.3	-11 38.2	-1.2020	0.5609	0.1642	-44	-90
39 Aquarii	6½	1.38	5.5	14 44.5	12 40.4	- 9 2.7	-0.4124	0.5594	0.1676	+10	-64
45 Aquarii	6½	1.39	5.9	13 51.7	15 39.1	- 6 10.2	-0.8245	0.5581	0.1719	-14	-90
50 Aquarii	6	1.41	6.0	14 5.7	18 7.2	- 3 47.0	-0.1528	0.5556	0.1752	+24	-47
B. A. C. 7835	6½	-1.42	-6.2	-13 29.1	20 39.6	- 1 19.8	-0.3409	0.5552	+0.1781	+14	-59
74 Aquarii	6	-1.45	-7.0	-12 12.6	**28** 7 31.4	+ 9 10.3	+0.3316	0.5489	+0.1904	+53	-20

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
					MARCH.						
ψ^1 Aquarii	4	-1.48	-7.6	- 9 41.6	28 18 6.0	- 4 35.9	-0.2416	0.5437	+0.2000	+22	-53
ψ^2 Aquarii	4	1.48	8.0	9 47.5	19 4.9	- 3 38.8	+0.0578	0.5429	0.2009	+38	-35
ψ^3 Aquarii	4½	-1.49	-7.9	-10 13.2	19 35.0	- 3 9.7	+0.6112	0.5424	+0.2010	+74	- 5
				NEW	*MOON.*						
					APRIL.						
64 Ceti	5½	-1.48	-9.8	+ 8 2.8	1 10 11.0	+ 8 48.3	-0.5046	0.5224	+0.2029	+11	-68
ξ^1 Ceti	4½	1.47	9.7	8 19.3	11 1.1	+ 9 36.8	-0.6359	0.5232	0.2028	+ 4	-78
ξ^2 Ceti	4½	-1.44	-9.4	+ 7 57.5	18 48.2	- 6 50.3	+1.3160	0.5232	+0.1969	+90	+52
B. A. C. 830	6	1.43	9.0	10 15.9	2 2 7.0	+ 0 15.8	+0.2218	0.5235	0.1908	+51	-23
μ Ceti	4½	1.41	9.0	9 38.6	3 21.8	+ 1 28.4	+1.1390	0.5242	0.1900	+90	+33
Lalande 5725	6	1.38	8.3	12 45.6	14 16.3	-11 56.7	-0.2578	0.5247	0.1796	+24	-48
B. A. C. 1119	6	1.31	7.2	16 10.4	3 6 54.0	+ 4 10.8	-1.1815	0.5285	0.1604	-36	-74
B. A. C. 1206	6	-1.27	-6.8	+16 59.7	13 45.4	+10 49.7	-1.0190	0.5303	+0.1519	-22	-73
B. A. C. 1272	6	1.21	6.4	17 2.5	21 8.3	- 4 1.0	+0.0128	0.5293	0.1414	+39	-28
δ^1 Tauri	4	1.16	6.1	17 16.8	4 4 30.9	+ 1 8.0	+0.7551	0.5326	0.1310	+90	+13
δ^2 Tauri	5½	1.15	6.1	17 11.0	5 5.4	+ 1 41.4	+0.9376	0.5326	0.1298	+90	+25
δ^3 Tauri	5	1.15	5.9	17 40.3	5 45.9	+ 2 20.6	+0.4844	0.5328	0.1291	+70	- 3
ϵ Tauri	3½	-1.15	-5.5	+18 55.9	7 16.5	+ 3 48.5	-0.7147	0.5328	+0.1264	- 2	-71
B. A. C. 1468	6½	1.08	5.1	18 31.8	15 55.7	-11 48.6	+0.7695	0.5359	0.1135	+90	+16
i Tauri	5½	1.06	5.0	18 38.9	18 24.3	- 9 24.7	+0.9152	0.5362	0.1092	+90	+25
l Tauri	5½	1.00	4.4	20 16.1	5 2 20.2	- 1 43.9	-0.0609	0.5375	0.0965	+35	-27
o Tauri	6	0.91	3.4	21 50.3	11 49.5	+ 7 27.3	-0.9652	0.5398	0.0800	-20	-68
ζ Tauri	3½	-0.86	-3.5	+21 4.3	16 37.5	-11 54.0	+0.2491	0.5408	+0.0714	+54	- 9
141 Tauri	6½	0.75	2.6	22 23.9	6 4 0.2	- 0 53.5	-0.5259	0.5437	0.0505	+ 8	-52
3 Geminorum	6½	0.71	2.2	23 7.8	7 46.7	+ 2 45.6	-1.1590	0.5445	0.0435	-38	-67
6 Geminorum	6½	0.70	2.2	22 55.9	9 0.2	+ 3 56.7	-0.8876	0.5450	0.0410	-14	-67
η Geminorum	3½	0.68	2.3	22 32.3	10 13.3	+ 5 7.4	-0.4041	0.5451	0.0391	+15	-42
μ Geminorum	3	-0.64	-2.2	+22 34.2	14 0.6	+ 8 47.4	-0.3039	0.5451	+0.0317	+21	-35
d Geminorum	6	0.49	2.0	21 53.5	7 3 24.4	- 2 15.3	+0.6931	0.5473	+0.0053	+90	+23
44 Geminorum	6	0.42	1.5	22 48.2	9 46.8	+ 3 54.5	-0.3175	0.5478	-0.0068	+20	-33
δ Geminor. *mult.*	3½	0.34	1.7	22 11.1	16 40.6	+10 34.5	+0.2674	0.5487	0.0207	+55	- 3
58 Geminorum	6½	0.32	1.2	23 9.4	18 12.4	-11 56.7	-0.8335	0.5489	0.0236	-11	-67
63 Geminor. *mult.*	5½	-0.29	-1.7	+21 40.3	20 13.3	- 9 59.9	+0.7473	0.5491	-0.0276	+90	+23
84 Geminorum	6½	0.15	1.2	22 37.1	8 7 54.1	+ 1 17.6	-0.7501	0.5499	0.0507	- 5	-67
7 Cancri	6½	0.10	1.2	22 22.9	12 55.2	+ 6 8.6	-0.7687	0.5501	0.0606	- 6	-68
μ^2 Cancri	5½	-0.07	1.3	21 54.2	14 44.6	+ 7 54.4	-0.3599	0.5494	0.0638	+18	-41
B. A. C. 2788	6	+0.01	1.5	21 5.9	20 34.9	-11 27.1	+0.1108	0.5492	0.0749	+45	-16
η Cancri	5½	+0.07	-1.6	+20 49.0	9 2 18.9	- 4 54.5	-0.0452	0.5490	-0.0859	+36	-25
35 Cancri	6½	0.09	1.8	19 58.3	3 33.0	- 3 42.8	+0.7667	0.5489	0.0883	+90	+19
39 Cancri	6½	0.11	1.6	20 23.9	5 45.1	- 1 35.1	+0.1029	0.5487	0.0924	+44	-18
40 Cancri	6½	0.11	1.6	20 21.7	5 47.4	- 1 32.9	+0.1372	0.5487	0.0926	+46	-16
ϵ Cancri	6½	0.11	1.7	19 56.3	5 55.0	- 1 25.6	+0.5848	0.5484	0.0928	+80	+ 8
SATURN				+17 54.9	20 14.7	-11 34.4	+1.2470	0.5495	-0.1183	+90	+55
80 Cancri	6½	+0.28	-2.1	18 29.9	20 33.5	-11 16.3	+0.5807	0.5482	0.1194	+79	+ 5
83 Cancri	5½	0.31	2.2	18 10.6	23 50.1	- 8 6.2	+0.5250	0.5482	0.1253	+74	+ 1
8 Leonis	5½	0.39	2.4	16 56.0	10 8 15.5	+ 0 2.4	+0.7398	0.5482	0.1392	+90	+12
37 Leonis	5½	0.57	3.3	14 16.8	11 2 48.1	- 6 1.7	+0.6982	0.5475	0.1681	+90	+ 7
42 Leonis	6	+0.59	-2.9	+15 32.0	5 12.4	- 3 42.2	-1.0350	0.5474	-0.1713	-23	-74
i Leonis	5½	0.63	3.1	14 42.2	10 4.0	+ 0 59.8	-1.0060	0.5467	0.1780	-20	-75
l Leonis	5½	0.70	4.1	11 7.9	18 5.3	+ 8 45.3	+1.2710	0.5466	0.1885	+90	+49
ω Virginis	6	0.86	4.8	4 44.8	12 17 8.6	+ 7 3.1	-0.8896	0.5479	0.2125	-11	-81
ν Virginis	4	0.88	5.0	7 9.0	20 36.2	+10 23.7	+0.0172	0.5486	0.2155	+39	-36
c Virginis	5½	+0.97	-5.4	+ 3 55.8	13 12 39.3	+ 1 55.0	-0.2299	0.5517	-0.2259	+26	-51
B. A. C. 4254	6	+1.00	-5.6	+ 2 27.9	20 57.3	+ 9 56.3	-0.6170	0.5530	-0.2290	+ 5	-80

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
80 Virginis	6	+1.08	-5.5	- 4 49.9	14 22 49.3	+10 55.6	+0.7905	0.5611	-0.2294	+85	+ 5
ξ¹ Libræ	6	1.09	3.9	11 26.8	16 9 0.7	- 4 6.1	-0.1160	0.5763	0.2047	+28	-45
ξ² Libræ	5½	1.08	3.9	10 57.8	10 1.3	- 3 7.6	-0.8026	0.5771	0.2038	-10	-90
γ Libræ	4½	1.05	2.7	14 25.1	17 2 4.2	-11 40.7	-0.4669	0.5851	0.1813	+ 8	-68
θ Libræ	4½	1.02	2.0	16 24.2	9 29.0	- 4 32.9	+0.2070	0.5889	0.1688	+41	-27
49 Libræ	6	+0.99	-1.9	-16 12.3	12 8.8	- 1 59.2	-0.4338	0.5898	-0.1641	+ 7	-66
χ Ophiuchi	4½	0.94	-0.9	18 12.3	22 44.9	+ 8 12.1	-0.0811	0.5936	0.1434	+23	-43
ξ Ophiuchi	5	0.75	+0.8	20 59.6	18 19 48.9	+ 4 25.8	+0.1611	0.6003	0.0958	+32	-29
58 Ophiuchi	5½	0.65	1.6	21 37.7	19 4 29.3	-11 14.8	+0.0550	0.6026	0.0743	+24	-35
P. xvii, 330	5½	0.57	2.3	23 8.4	12 14.1	- 3 48.8	+1.0720	0.6032	0.0546	+67	+29
P. xvii, 334	5½	+0.57	+2.2	-22 50.3	12 21.4	- 3 41.8	+0.7630	0.6032	-0.0542	+67	+ 6
μ Sagittarii	4	0.52	1.8	21 5.2	16 10.5	- 0 2.0	-1.1820	0.6023	0.0442	-55	-90
14 Sagittarii	6	0.52	2.1	21 44.3	16 21.2	+ 0 8.2	-0.5359	0.6023	0.0439	-10	-76
B. A. C. 6336	6	0.41	2.1	21 29.3	20 1 28.4	+ 8 53.2	-1.0790	0.6016	0.0198	-47	-90
B. A. C. 6343	6½	0.41	2.8	23 35.9	1 40.1	+ 9 4.4	+1.0370	0.6016	0.0194	+66	+26
JUPITER				-22 55.1	3 14.1	+10 34.7	+0.3255	0.6016	-0.0156	+35	-20
28 Sagittarii	5½	+0.37	+2.5	22 30.4	4 42.9	+11 59.9	-0.1074	0.6013	0.0119	+10	-45
30 Sagittarii	6½	0.35	2.4	22 17.3	6 27.7	-10 19.6	-0.3440	0.6007	0.0070	- 4	-60
31 Sagittarii	6½	0.34	2.4	22 3.0	6 57.9	- 9 50.6	-0.5872	0.6003	0.0054	-16	-81
ν¹ Sagittarii	5	0.33	2.6	22 52.8	7 44.2	- 9 6.2	+0.2450	0.6001	0.0037	+28	-24
ν² Sagittarii	5	+0.33	+2.6	-22 48.6	8 6.1	- 8 45.1	+0.1748	0.6001	-0.0025	+25	-28
B. A. C. 6448	6½	0.32	2.8	23 18.9	8 26.6	- 8 25.4	+0.6823	0.6001	-0.0018	+61	+ 1
o Sagittarii	3½	0.26	2.4	21 54.2	11 50.1	- 5 10.1	-0.7326	0.5989	+0.0069	-24	-90
50 Sagittarii	6	+0.15	2.5	-21 59.7	20 17.4	+ 2 56.9	-0.4907	0.5962	0.0284	- 9	-72
4 Capricorni	6	-0.15	2.5	22 9.1	21 16 55.0	- 1 14.9	+0.7785	0.5870	0.0766	+68	+ 7
20 Capricorni	6½	-0.36	+1.2	-19 27.9	22 10 9.1	- 8 38.9	-0.3036	0.5863	+0.1150	+ 9	-57
η Capricorni	5	0.39	1.4	20 17.6	12 10.1	- 6 42.2	+0.7856	0.5745	0.1189	+70	+ 6
30 Capricorni	5½	0.45	0.6	18 27.0	17 58.0	- 1 6.9	-0.3924	0.5711	0.1298	+ 7	-63
31 Capricorni	6½	0.45	+0.5	17 55.7	18 6.4	- 0 58.9	-0.9139	0.5709	0.1300	-24	-90
γ Capricorni	3½	0.56	-0.1	17 9.8	23 3 34.8	+ 8 9.2	-0.3973	0.5640	0.1465	+ 8	-63
δ Capricorni	2½	-0.59	-0.4	-16 37.8	6 38.7	+11 6.7	-0.4948	0.5623	+0.1513	+ 4	-71
39 Aquarii	6½	0.69	1.4	14 44.4	18 3.5	- 1 52.2	-0.6400	0.5551	0.1683	- 3	-85
45 Aquarii	6½	0.74	2.0	13 51.6	21 3.9	+ 1 2.0	-1.0490	0.5535	0.1723	-28	-90
50 Aquarii	6	0.76	1.9	14 5.6	23 33.5	+ 3 26.6	-0.3728	0.5513	0.1751	+12	-61
B. A. C. 7835	6½	0.78	2.2	13 29.0	24 2 7.9	+ 5 55.8	-0.5565	0.5500	0.1783	+ 4	-76
74 Aquarii	6	-0.89	-3.0	-12 12.5	13 8.1	- 7 25.7	+0.1351	0.5440	+0.1905	+42	-31
ψ¹ Aquarii	4	0.97	4.0	9 41.6	23 52.1	+ 2 57.7	-0.4190	0.5378	0.1999	+13	-64
ψ² Aquarii	4	0.98	4.1	9 47.5	25 0 51.9	+ 3 55.6	-0.1164	0.5378	0.2009	+29	-45
ψ³ Aquarii	4½	0.98	4.0	10 13.2	1 22.5	+ 4 25.2	+0.4373	0.5374	0.2036	+62	-15
B. A. C. 8274	7	1.07	5.2	6 59.9	15 56.1	- 5 28.4	+0.0230	0.5310	0.2105	+38	-37
30 Piscium	4½	-1.11	-5.6	- 6 38.0	22 38.7	+ 1 1.8	+1.0570	0.5284	+0.2132	+83	+22
33 Piscium	4½	1.13	5.7	6 19.8	26 0 20.9	+ 2 40.9	+1.0975	0.5284	0.2141	+84	+25
B. A. C. 17	6	1.14	5.8	5 51.9	2 51.4	+ 5 6.8	+1.1445	0.5272	0.2148	+84	+29
14 Ceti	6	1.20	7.1	1 7.0	15 40.8	- 6 27.0	-1.1660	0.5236	0.2178	-31	-90
15 Ceti	6½	1.21	7.1	- 1 7.0	16 59.2	- 5 10.9	-0.8818	0.5231	0.2178	-10	-90
26 Ceti	6	-1.27	-7.8	+ 0 46.2	27 6 13.7	+ 7 40.1	-0.0288	0.5214	+0.2178	+37	-40
29 Ceti	6½	1.27	7.9	1 24.6	8 23.1	+ 9 45.6	-0.2499	0.5206	0.2173	+25	-53
33 Ceti	6	1.28	7.9	1 51.2	9 43.2	+11 3.5	-0.4387	0.5202	0.2171	+15	-65
f Piscium	5	-1.30	-8.0	+ 3 1.7	13 28.2	- 9 18.2	-0.8954	0.5202	+0.2164	-11	-87
				NEW	*MOON.*						

MAY.

Name.	Mag.	Δα	Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
B. A. C. 1272	6	-1.37	-6.5	+17 2.5	1 4 24.6	+ 3 3.0	+0.1732	0.5316	+0.1436	+49	-20
δ¹ Tauri	4	-1.34	-6.2	+17 16.8	11 46.8	+10 11.5	+0.9301	0.5338	+0.1330	+90	+23
δ² Tauri	5½	-1.34	-6.2	+17 11.0	12 21.2	+10 44.8	+1.1130	0.5338	+0.1323	+90	+38

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"	° '	d h m	h m				°	°
δ^3 Tauri	5	-1.34	-6.0	+17 40.3	1 13 1.6	+11 23.9	+0.6605	0.5338	+0.1310	+88	+ 8
ε Tauri	3½	1.34	5.7	18 55.9	14 32.1	-11 8.3	-0.5388	0.5346	0.1288	+ 9	-60
B. A. C. 1468	6½	1.30	5.4	18 31.8	23 10.5	- 2 46.2	+0.9614	0.5370	0.1153	+90	+28
i Tauri	5½	1.29	5.3	18 38.9	2 1 38.8	- 0 22.6	+1.1110	0.5373	0.1113	+90	+40
l Tauri	5½	1.25	4.6	20 16.1	9 33.9	+ 7 17.5	+0.1442	0.5389	0.0980	+47	-16
o Tauri	6	-1.20	-3.9	+21 50.3	19 2.2	- 7 32.4	-0.7467	0 5408	+0.0816	- 4	-68
ζ Tauri	3½	1.17	3.7	21 4.3	23 49.8	- 2 54.0	+0.4751	0.5417	0.0727	+71	+ 4
141 Tauri	6½	1.10	2.9	22 23.9	3 11 12.1	+ 8 6.1	-0.2890	0.5449	0.0518	+22	-36
3 Geminorum	6½	1.07	2.5	23 7.8	14 58.7	+11 45.3	-0.9204	0.5455	0.0444	-17	-67
6 Geminorum	6½	1.07	2.5	22 55.9	16 12.1	-11 3.7	-0.6452	0.5455	0.0425	+ 2	-60
η Geminorum	3½	-1.06	-2.5	+22 32.3	17 25.2	- 9 53.0	-0.1608	0.5455	+0.0400	+29	-27
μ Geminorum	3	1.01	2.3	22 34.2	21 12.9	- 6 12.6	-0.0592	0.5457	0.0325	+35	-21
d Geminorum	6	0.89	1.8	21 53.5	4 10 38.1	+ 6 46.0	+0.9539	0.5464	+0.0065	+90	+38
44 Geminorum	6	0.83	1.2	22 48.2	17 2.8	-11 1.9	-0.0554	0.5471	-0.0065	+35	-18
δ Geminor. *mult.*	3½	0.76	1.0	22 11.1	23 58.8	- 4 19.6	+0.5378	0.5471	0.0203	+76	+12
58 Geminorum	6½	-0.75	-0.6	+23 9.4	5 1 31.3	- 2 50.2	-0.5710	0.5471	-0.0230	+ 6	-53
63 Geminor. *mult.*	5½	0.72	1.0	21 40.3	3 33.1	- 0 52.5	+1.0190	0.5473	0.0269	+90	+41
84 Geminorum	6½	0.59	0.2	22 37.1	15 20.2	+10 31.4	-0.4808	0.5464	0.0503	+11	-48
7 Cancri	6½	0.53	0.2	22 22.9	20 24.5	- 8 34.4	-0.4982	0.5464	0.0601	+10	-51
μ^2 Cancri	5½	0.50	0.3	21 54.2	22 15.1	- 6 47.4	-0.0842	0.5462	0.0632	+34	-25
B. A. C. 2788	6	-0.43	-0.2	+21 5.9	6 4 9.7	- 1 4.6	+0.3894	0.5453	-0.0746	+64	- 2
η Cancri	5½	0.36	0.2	20 49.0	9 58.6	+ 4 32.9	+0.2318	0.5453	0.0853	+53	-11
35 Cancri	6½	0.34	0.4	19 58.3	11 13.2	+ 5 45.1	+1.0500	0.5453	0.0875	+90	+38
39 Cancri	6½	0.32	0.3	20 23.9	13 27.6	+ 7 55.1	+0.3807	0.5444	0.0919	+63	- 4
40 Cancri	6½	0.32	0.3	20 21.7	13 30.0	+ 7 57.4	+0.4172	0.5444	0.0919	+66	- 2
ε Cancri	6½	-0.31	-0.5	+19 56.3	13 37.6	+ 8 4.7	+0.8690	0.5444	-0.0921	+90	+24
80 Cancri	6½	0.13	0.5	18 29.9	7 4 31.3	- 1 30.7	+0.8588	0.5424	0.1184	+90	+21
83 Cancri	5½	-0.10	0.6	18 10.6	7 51.8	+ 1 43.3	+0.8028	0.5424	0.1243	+90	+17
8 Leonis	5½	+0.01	0.8	16 56.0	16 27.1	+10 1.9	+1.0180	0.5407	0.1381	+90	+30
37 Leonis	5½	0.24	1.4	14 16.9	8 11 24.6	+ 4 22.6	+0.9590	0.5403	0.1670	+90	+22
42 Leonis	6	+0.26	-1.0	+15 32.1	13 52.3	+ 6 45.5	-0.7955	0.5399	-0.1701	- 6	-74
i Leonis	5½	0.31	1.2	14 42.3	18 50.8	+11 34.5	-0.7695	0.5392	0.1768	- 4	-75
ω Virginis	6	0.65	2.9	8 44.8	10 2 39.5	- 5 38.0	-0.6944	0.5404	0.2113	+ 1	-81
ν Virginis	4	0.69	3.2	7 9.0	6 11.8	- 2 12.6	+0.2149	0.5412	0.2143	+51	-25
c Virginis	5½	0.86	3.9	3 55.8	22 34.4	-10 21.9	-0.0634	0.5442	0.2250	+34	-41
B. A. C. 4254	6	+0.92	-4.3	+ 2 27.9	11 7 1.0	- 2 11.9	-0.4769	0.5470	-0.2289	+13	-68
80 Virginis	6	1.15	5.0	- 4 49.9	12 9 11.0	+ 9 5.5	+0.8642	0.5576	0.2305	+85	+ 9
88 Virginis	6½	1.20	5.1	6 17.1	14 53.1	+ 4 35.7	+1.0190	0.5610	0.2289	+84	+19
ξ^1 Libræ	6	1.36	4.1	11 26.8	13 19 20.4	+ 8 1.8	-0.1188	0.5781	0.2082	+29	-45
ξ^2 Libræ	5½	1.36	4.0	10 57.8	20 20.4	+ 8 59.6	-0.8039	0.5784	0.2071	- 9	-90
γ Libræ	4½	+1.42	-3.1	-14 25.2	14 12 10.8	+ 0 14.0	-0.5065	0.5888	-0.1853	+ 6	-72
θ Libræ	4½	1.44	2.7	16 24.2	19 27.7	+ 7 14.0	+0.1393	0.5947	0.1728	+38	-31
χ Ophiuchi	4½	1.45	-1.4	18 12.3	15 8 25.8	- 4 18.9	-0.1718	0.6015	0.1473	+19	-49
ξ Ophiuchi	5	1.41	+0.6	20 59.6	16 4 54.7	- 8 40.4	+0.0262	0.6098	0.0992	+24	-37
58 Ophiuchi	5½	1.36	1.5	21 37.7	13 18.6	- 0 37.6	-0.0902	0.6121	0.0774	+17	-43
P. xvii, 330	5½	+1.31	+2.4	-23 8.4	20 47.9	+ 6 32.9	+0.8933	0.6131	-0.0572	+67	+14
P. xvii, 334	5½	1.31	2.4	22 50.3	20 55.0	+ 6 39.7	+0.5893	0.6131	0.0568	+57	- 5
JUPITER				23 0.2	17 9 59.3	- 4 49.1	+0.2474	0.6156	0.0203	+30	-25
28 Sagittarii	5½	1.16	3.5	22 30.3	12 42.7	- 2 12.6	-0.2904	0.6116	0.0132	+ 1	-57
ν^1 Sagittarii	5	1.13	3.7	22 52.7	15 37.9	+ 0 35.3	+0.0545	0.6113	0.0051	+18	-35
ν^2 Sagittarii	5	+1.13	+3.7	-22 48.5	15 59.0	+ 0 55.6	-0.0165	0.6110	-0.0035	+14	-40
B. A. C. 6448	6½	1.12	3.8	23 18.8	16 18.8	+ 1 14.5	+0.4825	0.6110	-0.0031	+44	-11
o Sagittarii	3½	1.08	3.9	21 54.1	19 35.2	+ 4 22.8	-0.9139	0.6105	+0.0058	-36	-90
50 Sagittarii	6	1.00	4.3	21 59.6	18 3 45.1	-11 47.7	-0.6860	0.6070	0.0281	-20	-90
53 Sagittarii	6½	0.94	4.9	23 40.6	8 52.0	- 6 53.5	+1.1750	0.6053	0.0417	+66	+40
B. A. C. 6727	6	+0.94	+4.9	-23 40.8	8 58.7	- 6 47.0	+1.1830	0.6050	+0.0421	+66	+41
4 Capricorni	6	+0.75	+5.4	-22 9.0	23 42.3	+ 7 20.9	+0.5487	0.5958	+0.0788	+55	- 8

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0. Δα	Red'ns from 1889.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x′	y′	N.	S.
		s	″	° ′	d h m	h m				°	°
20 Capricorni	6½	+0.53	+4.9	-19 27.8	19 16 27.1	- 0 33.2	-0.5272	0.5835	+0.1164	- 3	-75
η Capricorni	5	0.50	5.2	20 17.5	18 24.9	+ 1 20.1	+0.5458	0.5813	0.1204	+58	- 8
30 Capricorni	5½	0.42	4.7	18 26.9	20 0 4.3	+ 6 46.8	-0.6206	0.5769	0.1313	- 7	-84
31 Capricorni	6½	0.42	4.5	17 55.6	0 12.3	+ 6 54.4	-1.1360	0.5769	0.1314	-41	-90
γ Capricorni	3½	0.30	4.3	17 9.7	9 28.2	- 8 10.0	-0.6272	0.5690	0.1478	- 5	-84
δ Capricorni	2½	+0.26	+4.1	-16 37.7	12 28.4	- 5 16.3	-0.7242	0.5666	+0.1529	-10	-90
50 Aquarii	6	+0.05	3.0	14 5.5	21 5 6.8	+10 47.3	-0.6020	0.5541	0.1768	0	-80
74 Aquarii	6	-0.10	2.0	12 12.5	18 32.6	- 0 13.8	-0.0908	0.5450	0.1916	+29	-44
ψ¹ Aquarii	4	0.21	1.0	9 41.5	22 5 12.5	+10 5.3	-0.6403	0.5382	0.2009	+ 2	-83
ψ² Aquarii	4	0.23	0.8	9 47.4	6 12.0	+11 3.0	-0.3369	0.5371	0.2016	+18	-59
ψ³ Aquarii	4½	-0.24	+1.1	-10 13.1	6 42.6	+11 32.6	+0.2158	0.5367	+0.2018	+48	-27
B. A. C. 8274	7	0.37	-0.2	6 59.8	21 14.8	+ 1 37.6	-0.1823	0.5296	0.2110	+27	-49
30 Piscium	4½	0.43	0.7	6 37.9	23 3 58.0	+ 8 8.3	+0.8562	0.5270	0.2141	+83	+ 8
33 Piscium	4½	0.45	0.8	6 19.7	5 40.5	+ 9 47.7	+0.9008	0.5258	0.2144	+84	+11
B. A. C. 17	6	0.47	1.1	5 51.8	8 11.5	-11 45.8	+0.9448	0.5253	0.2153	+84	+14
20 Ceti	5	-0.66	-2.7	- 1 44.9	24 6 7.9	+ 9 31.6	+1.3105	0.5181	+0.2182	+88	+46
26 Ceti	6	0.69	3.5	+ 0 46.3	11 44.5	- 9 1.7	-0.1838	0.5177	0.2180	+29	-50
29 Ceti	6½	0.71	3.7	1 24.7	13 55.1	- 6 55.0	-0.3999	0.5169	0.2175	+17	-63
33 Ceti	6	0.72	3.8	1 51.3	15 15.9	- 5 36.4	-0.5891	0.5169	0.2172	+ 7	-78
35 Ceti	6½	0.73	3.9	1 53.1	16 17.8	- 4 36.4	-0.3971	0.5169	0.2172	+18	-63
f Piscium	5	-0.75	-4.3	+ 3 1.8	19 3.0	- 1 56.0	-1.0400	0.5163	+0.2164	-20	-87
ν Piscium	4½	0.84	4.9	4 55.5	25 7 25.8	+10 5.2	-0.4411	0.5152	0.2129	+15	-65
64 Ceti	5½	0.94	5.5	8 2.9	23 6.4	+ 1 18.5	-0.5702	0.5164	0.2047	+ 8	-73
ξ¹ Ceti	4½	0.94	5.6	8 19.4	23 57.5	+ 2 8.3	-0.6995	0.5164	0.2042	+ 1	-82
B. A. C. 755	6½	0.97	5.9	10 3.7	26 7 7.7	+ 9 5.9	-1.1550	0.5181	0.1996	-30	-80
ξ² Ceti	4½	-0.97	-5.5	+ 7 57.6	7 53.1	+ 9 50.0	+1.3015	0.5182	+0.1993	+90	+48
B. A. C. 830	6	1.01	5.9	10 15.9	15 19.0	- 6 57.1	+0.2308	0.5192	0.1936	+52	-23
μ Ceti	4½	1.02	5.8	9 38.6	16 34.4	- 5 43.9	+1.1580	0.5193	0.1923	+90	+33
Lalande 5725	6	1.07	6.1	12 45.6	27 3 38.1	+ 5 0.2	-0.1986	0.5223	0.1825	-43	-77
				NEW	*MOON.*						
ζ Tauri	3½	-1.18	-3.6	+21 4.3	30 6 13.2	+ 5 16.8	+0.5630	0.5425	+0.0740	+79	+ 9
1 Geminorum	5	1.15	2.8	23 16.2	18 42.3	- 6 38.5	-1.0960	0.5450	0.0510	-31	-67
η Geminorum	3½	1.13	2.6	22 32.3	23 47.5	- 1 43.2	-0.0463	0.5462	0.0414	+36	-21
μ Geminorum	3	1.12	2.3	22 34.2	31 3 34.9	+ 1 56.8	+0.0593	0.5467	0.0342	+43	-15
d Geminorum	6	-1.03	-1.7	+21 53.5	16 59.5	- 9 5.1	+1.0925	0.5480	+0.0074	+90	+48
44 Geminorum	6	-0.99	-1.2	+22 48.2	23 24.0	- 2 53.2	+0.0850	0.5480	-0.0054	+44	-11
					JUNE.						
δ Geminor. *mult.*	3½	-0.95	-1.0	+22 11.1	1 6 20.2	+ 3 49.2	+0.6858	0.5480	-0.0189	+90	+21
58 Geminorum	6½	0.94	0.8	23 9.4	7 52.8	+ 5 18.8	-0.4233	0.5482	0.0222	+15	-41
63 Geminor. *mult.*	5½	0.92	1.0	21 40.3	9 54.6	+ 7 16.5	+1.1740	0.5484	0.0262	+90	+55
82 Geminorum	6½	0.85	0.0	23 24.8	19 36.7	- 7 21.5	-1.1020	0.5475	0.0454	-32	-67
84 Geminorum	6½	0.83	-0.1	22 37.1	21 42.9	- 5 19.5	-0.3211	0.5474	0.0493	+20	-38
7 Cancri	6½	-0.78	+0.1	+22 22.9	2 2 48.2	- 0 23.2	-0.3352	0.5464	-0.0590	+20	-39
μ¹ Cancri	6½	0.78	0.3	22 57.1	3 56.9	+ 0 43.3	-1.0330	0.5464	0.0614	-25	-67
μ² Cancri	5½	0.76	0.1	21 54.2	4 39.2	+ 1 24.2	+0.0810	0.5464	0.0627	+43	-16
B. A. C. 2788	6	0.70	0.2	21 5.9	10 35.6	+ 7 8.9	+0.5644	0.5453	0.0740	+79	+ 9
η Cancri	5½	0.67	0.4	20 49.0	16 26.5	-11 11.6	+0.4110	0.5438	0.0848	+65	- 2
35 Cancri	6½	-0.64	+0.3	+19 58.3	17 41.6	- 9 58.9	+1.2330	0.5438	-0.0870	+90	+56
39 Cancri	6½	0.62	0.5	20 23.9	19 57.1	- 7 47.9	+0.5623	0.5428	0.0909	+78	+ 7
40 Cancri	6½	0.62	0.5	20 21.7	19 59.6	- 7 45.5	+0.5971	0.5428	0.0911	+82	+ 9
ε Cancri	6½	0.62	0.4	19 56.3	20 7.4	- 7 38.0	+1.0520	0.5428	0.0911	+90	+37
γ Cancri	4½	0.61	0.9	21 52.1	21 26.4	- 6 21.6	-1.1920	0.5426	0.0940	-41	-68
80 Cancri	6½	-0.46	+0.6	+18 29.9	3 11 9.1	+ 6 54.7	+1.0530	0.5404	-0.1176	+90	+35
83 Cancri	5½	-0.41	+0.6	+18 10.6	14 32.0	+10 11.0	+0.9963	0.5392	-0.1229	+90	+30

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
8 Leonis	5½	−0.30	+9.5	+16 56.0	3 23 14.4	− 5 23.3	+1.2200	0.5386	−0.1373	+90	+48
37 Leonis	5½	0.10	0.3	14 16.9	4 18 31.4	−10 42.9	+1.1630	0.5342	0.1651	+90	+38
42 Leonis	6	0.08	0.7	15 32.1	21 2.2	− 8 16.9	−0.6113	0.5342	0.1685	+ 5	−69
i Leonis	5½	−0.02	+0.6	14 42.3	5 2 7.0	− 3 21.7	−0.5860	0.5328	0.1749	+ 7	−69
ω Virginis	6	+0.37	−0.8	8 44.9	6 10 44.7	+ 4 14.9	−0.5229	0.5323	0.2088	+11	−69
ν Virginis	4	+0.42	−1.2	+ 7 9.1	14 23.2	+ 7 46.5	+0.3948	0.5323	−0.2116	+62	−16
π Virginis	5	0.51	1.1	7 13.9	21 44.6	− 9 5.9	−1.2620	0.5339	0.2168	−41	−83
c Virginis	5½	0.61	2.1	3 55.9	7 7 15.5	+ 0 7.2	+0.1007	0.5352	0.2222	+44	−33
B. A. C. 4254	6	0.72	2.3	+ 2 28.0	15 57.6	+ 8 32.7	−0.3264	0.5382	0.2259	+21	−58
80 Virginis	6	1.02	3.2	− 4 49.9	8 18 54.1	+10 36.6	+1.0080	0.5492	0.2283	+85	+18
88 Virginis	6½	+1.10	−3.8	− 6 17.1	9 0 45.3	− 7 44.0	+1.1460	0.5530	−0.2271	+84	+29
ξ^1 Libræ	6	1.42	3.7	11 26.8	10 5 50.1	− 3 40.4	−0.0514	0.5720	0.2075	+32	−42
ξ^2 Libræ	5½	1.43	3.5	10 57.8	6 51.1	− 2 41.5	−0.7396	0.5735	0.2065	− 6	−90
γ Libræ	4½	1.58	2.9	14 25.2	22 53.8	−11 14.8	−0.4678	0.5865	0.1858	+ 8	−69
η Libræ	6	1.61	2.8	15 19.1	11 2 20.8	− 7 55.7	−0.2102	0.5882	0.1803	+21	−51
θ Libræ	4½	+1.64	−2.7	−16 24.2	6 13.9	− 4 11.6	+0.1708	0.5921	−0.1741	+40	−29
χ Ophiuchi	4½	1.75	−1.6	18 12.3	19 14.0	+ 8 17.5	−0.1634	0.6008	0.1490	+20	−48
ξ Ophiuchi	5	1.84	+0.6	20 59.6	12 15 35.8	+ 3 48.8	+0.0049	0.6135	0.1013	+24	−38
58 Ophiuchi	5½	1.85	1.5	21 37.7	23 52.4	+11 44.5	−0.1254	0.6172	0.0792	+15	−46
Jupiter				23 10.8	13 15 51.0	+ 3 1.9	+0.4796	0.6253	0.0341	+47	−11
28 Sagittarii	5½	+1.81	+4.4	−22 30.4	22 49.6	+ 9 42.4	−0.3497	0.6205	−0.0127	− 3	−61
ν^1 Sagittarii	5	1.80	4.7	22 52.7	14 1 40.4	−11 34.1	−0.0147	0.6197	0.0060	+14	−40
ν^2 Sagittarii	5	1.79	4.7	22 48.5	2 1.1	−11 14.2	−0.0866	0.6197	−0.0049	+11	−43
o Sagittarii	3½	1.77	5.1	21 54.1	5 31.6	− 7 52.7	−0.9754	0.6194	+0.0049	−40	−90
4 Capricorni	6	1.55	7.5	22 9.0	15 8 48.0	− 5 45.4	+0.4380	0.6064	0.0793	+47	−14
η Capricorni	5	+1.34	+8.3	−20 17.5	16 2 53.1	+11 36.1	+0.4207	0.5923	+0.1217	+50	−15
30 Capricorni	5½	1.27	8.1	18 26.9	8 20.8	− 7 8.9	−0.7302	0.5883	0.1329	−13	−90
γ Capricorni	3½	1.16	8.1	17 9.7	17 26.0	+ 1 35.6	−0.7423	0.5790	0.1502	−11	−90
δ Capricorni	2½	1.12	8.0	16 37.7	20 20.1	+ 4 23.2	−0.8364	0.5769	0.1548	−17	−90
29 Aquarii *mult.*	6½	1.05	8.3	17 29.8	17 2 51.4	+10 40.0	+1.0860	0.5719	0.1658	+73	+27
50 Aquarii	6	+0.93	+7.6	−14 5.5	12 26.7	− 4 5.2	−0.7275	0.5623	+0.1793	− 7	−90
B. A. C. 7835	6½	0.90	7.5	13 28.9	14 54.4	− 1 42.7	−0.9095	0.5613	0.1826	−18	−90
56 Aquarii	6½	0.90	8.0	15 9.0	15 1.0	− 1 36.3	+0.8222	0.5611	0.1828	+75	+ 7
74 Aquarii	6	0.77	7.2	12 12.4	18 1 29.3	+ 8 30.5	−0.2289	0.5522	0.1945	+22	−52
ψ^1 Aquarii	4	0.67	6.2	9 41.4	11 52.6	− 5 27.0	−0.7731	0.5448	0.2035	− 7	−90
ψ^2 Aquarii	4	+0.64	+6.3	− 9 47.3	12 50.7	− 4 30.7	−0.4732	0.5437	+0.2042	+11	−68
ψ^3 Aquarii	4½	0.63	6.4	10 13.0	13 20.4	− 4 2.0	+0.0728	0.5432	0.2044	+40	−35
B. A. C. 8274	7	0.46	5.2	6 59.7	19 3 33.5	+ 9 43.7	−0.3240	0.5344	0.2133	+20	−58
30 Piscium	4½	0.40	4.9	6 37.8	10 9.3	− 7 52.9	+0.7101	0.5308	0.2159	+84	0
33 Piscium	4½	0.38	4.7	6 19.6	11 49.9	− 6 15.4	+0.7523	0.5296	0.2163	+80	+ 2
B. A. C. 17	6	+0.35	+4.6	− 5 51.7	14 18.5	− 3 51.3	+0.7974	0.5283	+0.2169	+84	+ 5
15 Ceti	6½	0.21	2.8	1 6.8	20 4 18.8	+ 9 43.5	−1.1810	0.5223	0.2194	−32	−90
20 Ceti	5	0.13	2.9	− 1 44.8	11 58.0	− 6 51.0	+1.1750	0.5201	0.2197	+88	+31
26 Ceti	6	0.08	1.8	+ 0 46.3	17 31.8	− 1 27.1	−0.3059	0.5183	0.2189	+22	−57
29 Ceti	6½	0.06	1.5	1 24.7	19 41.3	+ 0 38.6	−0.5214	0.5181	0.2187	+11	−72
33 Ceti	6	+0.05	+1.4	+ 1 51.3	21 1.6	+ 1 56.6	−0.7060	0.5174	+0.2182	+ 1	−89
35 Ceti	6½	0.04	1.4	1 53.1	22 3.0	+ 2 56.2	−0.5160	0.5169	0.2178	+11	−71
f Piscium	5	+0.03	1.0	3 1.8	21 0 47.1	+ 5 35.5	−1.1540	0.5164	0.2173	−29	−87
ν Piscium	4½	−0.09	+0.1	4 55.6	13 7.1	− 6 26.1	−0.5524	0.5150	0.2130	+ 9	−74
64 Ceti	5½	0.23	−1.1	8 3.0	22 4 46.8	+ 8 46.3	−0.6709	0.5150	0.2053	+ 3	−81
ξ^1 Ceti	4½	−0.24	−1.2	+ 8 19.5	5 37.8	+ 9 35.9	−0.7982	0.5148	+0.2045	− 5	−82
B. A. C. 755	6½	0.29	1.9	10 3.8	12 48.6	− 7 25.8	−1.2480	0.5162	0.2000	−40	−80
ξ^2 Ceti	4½	0.30	1.3	7 57.7	13 34.1	− 6 41.7	+1.2040	0.5162	0.1993	+90	+37
B. A. C. 830	6	0.36	2.0	10 16.0	21 1.0	+ 0 32.2	+0.1444	0.5170	0.1934	+47	−28
μ Ceti	4½	0.37	1.9	9 38.7	22 17.2	+ 1 46.2	+1.0720	0.5170	0.1926	+90	+26
Lalande 5725	6	−0.45	−2.7	+12 45.7	23 9 22.8	−11 27.7	−0.2752	0.5198	+0.1821	+24	−49
Venus				+14 6.5	12 59.6	− 7 57.3	−1.1110	0.4865	+0.1705	−27	−76

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
B. A. C. 1119	6	−0.57	−3.4	+16 10.4	**24** 2 14.4	+ 4 53.7	−1.1160	0.5241	+0.1638	−29	−74
B. A. C. 1206	6	0.61	3.5	16 59.7	9 10.2	+11 37.1	−0.9208	0.5265	0.1554	−14	−73
B. A. C. 1272	6	0.66	3.5	17 2.5	16 37.0	− 5 9.7	+0.1479	0.5289	0.1456	+47	−22
δ^1 Tauri	4	0.71	3.4	17 16.8	**25** 0 2.6	+ 2 2.3	+0.9243	0.5313	0.1350	+90	+23
δ^2 Tauri	5½	0.71	3.4	17 11.0	0 37.2	+ 2 35.7	+1.1110	0.5313	0.1342	+90	+37
δ^3 Tauri	5	−0.72	−3.5	+17 40.3	1 17.9	+ 4 15.1	+0.6582	0.5314	+0.1333	+88	+ 7
ε Tauri	3½	0.72	3.6	18 55.9	2 49.0	+ 4 43.5	−0.5398	0.5319	0.1309	+ 9	−60
i Tauri	5½	0.77	3.3	18 38.9	13 59.4	− 8 27.0	+1.1430	0.5360	0.1135	+90	+43
l Tauri	5½	0.80	3.4	20 16.1	21 56.1	− 0 45.2	+0.1908	0.5384	0.1004	+50	−15
ζ Tauri	3½	0.85	3.0	21 4.4	**26** 12 13.3	−10 55.6	+0.5530	0.5433	+0.0754	+77	+ 8
				NEW	*MOON.*						
δ Geminor. *mult.*	3½	−0.87	−0.9	+22 11.1	**28** 12 15.8	+11 32.3	+0.7117	0.5496	−0.0185	+90	+22
μ^2 Cancri	5½	0.79	+0.2	21 54.2	**29** 10 30.5	+ 9 2.9	+0.1179	0.5478	0.0622	+46	−14
B. A. C. 2788	6	0.75	0.4	21 5.9	16 25.7	− 9 13.6	+0.6030	0.5467	0.0740	+83	+11
η Cancri	5½	−0.73	+0.6	+20 49.0	22 15.8	− 3 35.0	+0.4540	0.5459	−0.0846	+69	+ 2
35 Cancri	6½	0.71	0.6	19 58.3	23 30.6	− 2 22.6	+1.2770	0.5458	0.0870	+90	+64
39 Cancri	6½	0.70	0.7	20 23.9	**30** 1 45.9	− 0 11.7	+0.6056	0.5445	0.0908	+83	+ 9
40 Cancri	6½	0.70	0.7	20 21.7	1 48.3	− 0 9.4	+0.6404	0.5446	0.0908	+87	+11
ε Cancri	6½	0.69	0.7	19 56.3	1 56.2	− 0 1.7	+1.0950	0.5446	0.0911	+90	+41
γ Cancri	4½	−0.70	+0.7	+21 52.1	3 15.0	+ 1 14.5	−1.1490	0.5446	−0.0934	−36	−68
80 Cancri	6½	0.60	1.0	18 29.9	16 57.0	− 9 30.1	+1.1040	0.5413	0.1176	+90	+39
83 Cancri	5½	−0.56	+1.0	+18 10.6	20 20.0	− 6 13.6	+1.0510	0.5409	−0.1228	+90	+34
					JULY.						
8 Leonis	5½	−0.50	+1.3	+16 56.0	**1** 5 2.9	+ 2 12.6	+1.2750	0.5380	−0.1370	+90	+57
37 Leonis	5½	0.32	1.3	14 16.9	**2** 0 25.0	− 3 1.9	+1.2280	0.5341	0.1648	+90	+45
42 Leonis	6	0.30	1.6	15 32.1	2 56.9	− 0 34.8	−0.5551	0.5332	0.1680	+ 8	−66
i Leonis	5½	−0.25	1.6	14 42.3	8 4.2	+ 4 23.0	−0.5307	0.5320	0.1744	+10	−65
ω Virginis	6	+0.09	+0.8	+ 8 44.9	**3** 17 8.8	−11 33.4	−0.4717	0.5320	−0.2088	+13	−65
ν Virginis	4	0.13	0.5	7 9.1	20 51.3	− 7 57.8	+0.4610	0.5272	0.2096	+67	−12
π Virginis	5	0.21	+0.7	7 13.9	**4** 4 22.2	− 0 40.7	−1.2170	0.5277	0.2145	−36	−83
c Virginis	5½	0.35	−0.2	3 55.9	14 6.5	+ 8 45.7	+0.1617	0.5288	0.2196	+48	−30
B. A. C. 4254	6	0.45	0.5	+ 2 28.0	23 2.2	− 6 35.2	−0.2745	0.5302	0.2229	+24	−54
80 Virginis	6	+0.79	−2.2	− 4 49.8	**6** 2 47.7	− 3 42.1	+1.0710	0.5401	−0.2248	+85	+23
88 Virginis	6½	0.87	2.5	6 17.0	8 50.5	+ 2 8.9	+1.2095	0.5437	0.2234	+84	+35
ξ^1 Libræ	6	1.27	2.5	11 26.7	**7** 14 54.0	+ 7 11.5	−0.0169	0.5620	0.2138	+35	−40
ξ^2 Libræ	5½	1.27	2.4	10 57.7	15 57.1	+ 8 12.5	−0.7204	0.5633	0.2033	− 5	−90
17 Libræ	7	1.28	2.3	10 42.5	16 36.6	+ 8 50.6	−1.1110	0.5639	0.2029	−30	−90
18 Libræ	6½	+1.28	−2.3	−10 41.9	16 53.5	+ 9 6.8	−1.1770	0.5643	−0.2026	−36	−90
o^2 Libræ	6½	1.44	2.7	14 44.3	**8** 3 13.9	− 4 55.0	+0.8594	0.5719	0.1903	+75	+10
γ Libræ	4½	1.50	2.3	14 25.1	8 30.1	+ 0 9.6	−0.4467	0.5765	0.1830	+ 9	−67
η Libræ	6	1.55	2.2	15 19.1	12 3.3	+ 3 34.8	−0.1880	0.5793	0.1777	+22	−50
θ Libræ	4½	1.61	2.2	16 24.2	16 3.1	+ 7 25.6	+0.1960	0.5830	0.1712	+41	−28
49 Libræ	6	+1.64	−1.9	−16 12.3	18 44.8	+10 1.1	−0.4584	0.5853	−0.1673	+ 6	−68
χ Ophiuchi	4½	1.76	−1.4	18 12.3	**9** 5 23.6	− 3 44.8	−0.1454	0.5938	0.1475	+20	−47
ξ Ophiuchi	5	1.99	+0.5	20 59.6	**10** 2 9.6	− 7 49.2	+0.0147	0.6080	0.1007	+24	−38
58 Ophiuchi	5½	2.06	1.4	21 37.7	10 33.7	+ 0 13.9	−0.1179	0.6131	0.0792	+15	−46
P. xvii, 330	5½	2.10	2.2	23 8.4	18 0.1	+ 7 21.4	+0.8527	0.6170	0.0588	+67	+11
P. xvii, 334	5½	+2.10	+2.2	−22 50.3	18 7.2	+ 7 28.2	+0.5474	0.6163	−0.0585	+53	− 8
JUPITER				23 19.2	21 13.7	+10 26.8	+0.8527	0.6229	0.0501	+67	+11
28 Sagittarii	5½	2.16	4.4	22 30.3	**11** 9 38.8	− 1 39.9	−0.3497	0.6203	0.0147	− 3	−61
ν^1 Sagittarii	5	2.18	4.8	22 52.7	12 29.6	+ 1 3.3	−0.0130	0.6201	0.0065	+14	−40
ν^2 Sagittarii	5	2.18	4.8	22 48.5	12 50.1	+ 1 23.0	−0.0850	0.6201	−0.0054	+10	−44
o Sagittarii	3½	+2.17	+5.3	−21 54.1	16 20.3	+ 4 44.1	−0.9754	0.6201	+0.0046	−40	−90
4 Capricorni	6	+2.12	+8.7	−22 9.0	**12** 19 22.3	+ 6 37.1	+0.4318	0.6115	+0.0797	+47	−14

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
η Capricorni	5	+2.01	+10.3	-20 17.4	13 13 7.7	- 0 21.2	+0.4098	0.5988	+0.1233	+49	-16
30 Capricorni	5½	1.97	10.6	18 26.8	18 28.1	+ 4 46.5	-0.7330	0.5956	0.1348	-13	-90
γ Capricorni	3½	1.87	11.1	17 9.6	14 3 20.1	-10 42.2	-0.7450	0.5888	0.1522	-12	-90
δ Capricorni	2½	1.84	11.1	16 37.6	6 10.0	- 7 58.8	-0.8401	0.5849	0.1575	-17	-90
50 Aquarii	6	1.69	11.4	14 5.4	21 50.0	+ 7 6.1	-0.7288	0.5724	0.1823	- 7	-90
B. A. C. 7835	6½	+1.67	+11.4	-13 28.8	15 0 13.4	+ 9 24.3	-0.9055	0.5705	+0.1856	-18	-90
56 Aquarii	6½	1.67	11.8	15 8.9	0 19.9	+ 9 30.6	+0.8010	0.5705	0.1856	+75	+ 6
74 Aquarii	6	1.56	11.5	12 12.3	10 29.7	- 4 41.2	-0.2330	0.5588	0.1967	+22	-52
ψ^1 Aquarii	4	1.45	10.9	9 41.3	20 34.5	+ 5 2.7	-0.7691	0.5535	0.2068	- 6	-90
ψ^2 Aquarii	4	1.45	11.0	9 47.2	21 30.9	+ 5 57.3	-0.4751	0.5524	0.2075	+11	-68
ψ^3 Aquarii	4½	+1.44	+11.0	-10 12.9	21 59.7	+ 6 25.1	+0.0649	0.5518	+0.2079	+39	-35
B. A. C. 8274	7	1.30	10.3	6 59.6	16 11 47.9	- 4 14.0	-0.3213	0.5426	0.2168	+20	-58
30 Piscium	4½	1.23	10.2	6 37.7	18 12.4	+ 1 58.0	+0.6996	0.5392	0.2195	+84	- 1
33 Piscium	4½	1.21	10.1	6 19.5	19 50.1	+ 3 32.5	+0.7413	0.5375	0.2196	+84	+ 1
B. A. C. 17	6	1.18	10.0	5 51.6	22 14.7	+ 5 52.6	+0.7877	0.5364	0.2206	+84	+ 4
15 Ceti	6½	+1.07	+ 8.3	- 1 6.8	17 11 52.8	- 4 54.8	-1.1670	0.5289	+0.2223	-31	-90
20 Ceti	5	0.98	8.2	- 1 44.8	19 21.1	+ 2 19.8	+1.1640	0.5262	0.2222	+88	+30
26 Ceti	6	0.93	7.2	+ 0 46.4	18 0 47.2	+ 7 36.0	-0.3009	0.5242	0.2214	+22	-57
29 Ceti	6½	0.91	7.0	1 24.8	2 53.9	+ 9 38.8	-0.5159	0.5237	0.2211	+11	-72
33 Ceti	6	0.90	6.8	1 51.4	4 12.7	+10 55.3	-0.6950	0.5229	0.2206	+ 2	-88
35 Ceti	6½	+0.89	+ 6.7	+ 1 53.2	5 12.7	+11 53.5	-0.5071	0.5223	+0.2202	+12	-71
f Piscium	5	0.87	6.3	3 1.9	7 53.5	- 9 30.5	-1.1400	0.5218	0.2196	-28	-87
ν Piscium	4½	0.75	5.3	4 55.7	19 59.4	+ 2 13.7	-0.5439	0.5193	0.2151	+10	-73
64 Ceti	5½	0.60	3.9	8 3.1	19 11 24.8	- 6 48.1	-0.6624	0.5183	0.2065	+ 3	-80
ξ^1 Ceti	4½	0.60	3.8	8 19.6	12 15.4	- 5 58.9	-0.7850	0.5180	0.2060	- 4	-82
B. A. C. 755	6½	+0.54	+ 3.0	+10 3.9	19 21.1	+ 0 54.2	-1.2320	0.5181	+0.2011	-38	-80
ξ^2 Ceti	4½	0.53	3.7	7 57.8	20 6.0	+ 1 37.8	+1.2030	0.5181	0.2002	+90	+37
B. A. C. 830	6	0.47	2.6	10 16.0	20 3 28.5	+ 8 47.3	+0.1509	0.5188	0.1942	+47	-27
u Ceti	4½	0.45	2.9	9 38.7	4 44.1	+10 0.6	+1.0740	0.5188	0.1931	+90	+27
Lalande 5725	6	0.35	2.4	12 45.7	15 44.5	- 3 18.5	-0.2628	0.5200	0.1825	+24	-49
B. A. C. 1119	6	+0.20	+ 0.1	+16 10.5	21 8 31.3	-11 1.8	+1.1050	0.5236	+0.1637	-28	-74
B. A. C. 1206	6	0.14	+ 0.2	16 59.8	15 26.0	- 4 19.6	-0.9082	0.5259	0.1550	-13	-73
B. A. C. 1272	6	0.07	- 0.4	17 2.6	22 52.0	+ 2 52.8	+0.1547	0.5276	0.1451	+48	-22
δ^1 Tauri	4	0.01	0.6	17 16.9	22 6 17.3	+10 4.4	+0.9317	0.5303	0.1347	+90	+23
δ^2 Tauri	5½	+0.01	0.6	17 11.1	6 51.8	+10 37.8	+1.1160	0.5305	0.1338	+90	+38
δ^3 Tauri	5	0.00	- 0.8	+17 40.4	7 32.5	+11 17.2	+0.6662	0.5307	+0.1328	+89	+ 8
ε Tauri	3½	+0.01	1.0	18 56.0	9 3.5	-11 14.5	-0.5296	0.5309	0.1305	+ 9	-59
B. A. C. 1468	6½	-0.07	1.0	18 31.9	17 44.9	- 2 49.4	+0.9945	0.5342	0.1172	+90	+30
i Tauri	5½	0.09	1.1	18 39.0	20 14.3	- 0 24.7	+1.1500	0.5346	0.1133	+90	+43
VENUS				19 44.6	23 3 55.6	+ 7 2.0	+0.7590	0.4917	0.0939	+90	+16
l Tauri	5½	-0.16	- 1.5	+20 16.2	4 10.9	+ 7 16.8	+0.1978	0.5371	+0.1000	+51	-14
105 Tauri	6	0.16	1.8	21 33.5	4 12.2	+ 7 18.0	-1.2290	0.5371	0.0998	-46	-68
κ Tauri	5½	0.21	1.8	21 58.9	9 39.8	-11 24.7	-1.1790	0.5394	0.0907	-39	-68
ο Tauri	6	0.24	1.8	21 50.4	13 40.5	- 7 31.8	-0.6724	0.5405	0.0835	0	-66
ζ Tauri	3½	0.27	1.7	21 4.4	18 28.4	- 2 53.1	+0.5611	0.5423	0.0745	+78	+ 9
141 Tauri	6½	-0.35	- 1.8	+22 23.9	24 5 50.4	+ 8 6.8	-0.1816	0.5453	+0.0538	+28	-30
1 Geminorum	5	0.37	2.0	23 16.2	6 57.8	+ 9 12.0	-1.0910	0.5455	0.0515	-31	-67
3 Geminorum	6½	0.38	1.9	23 7.8	9 36.6	+11 45.6	-0.8037	0.5463	0.0463	- 8	-67
6 Geminorum	6½	0.38	1.8	22 55.9	10 49.8	-11 3.6	-0.5297	0.5464	0.0441	+ 9	-51
η Geminorum	3½	0.39	1.8	22 32.3	12 2.8	- 9 53.0	-0.0407	0.5469	0.0417	+36	-21
μ Geminorum	3	-0.40	- 1.6	+22 34.2	15 49.7	- 6 13.4	+0.0684	0.5469	+0.0342	+43	-14
d Geminorum	6	0.46	1.3	21 53.5	25 5 11.6	+ 6 41.9	+1.1020	0.5492	+0.0080	+90	+49
44 Geminorum	6	0.49	1.3	22 48.2	11 34.1	-11 8.2	+0.1016	0.5505	-0.0048	+45	-10
δ Geminor. *mult.*	3½	-0.49	- 1.1	22 11.1	18 28.0	- 4 28.1	+0.7031	0.5505	0.0188	+90	+22
MERCURY				22 19.4	26 2 23.0	+ 3 11.1	+0.3383	0.4635	0.0298	+60	0
MARS				+22 29.0	6 17.0	+ 6 57.5	+0.0074	0.5213	-0.0378	+39	-18

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
				NEW	*MOON.*						
37 Leonis	5½	−0.39	+ 1.5	+14 16.9	**29** 6 6.9	+ 4 27.4	+1.1810	0.5365	−0.1661	+90	+40
42 Leonis	6	0.37	1.8	15 32.1	8 37.6	+ 6 53.3	−0.5993	0.5356	0.1691	+ 6	−69
i Leonis	5½	0.34	1.9	14 42.3	13 43.3	+11 49.4	−0.5784	0.5340	0.1755	+ 7	−68
ω Virginis	6	−0.10	+ 1.7	+ 8 44.9	**30** 22 42.4	− 4 12.5	−0.5348	0.5286	−0.2079	+10	−70
ν Virginis	4	−0.07	1.4	7 9.1	**31** 2 25.3	− 0 36.4	+0.3932	0.5283	0.2105	+63	−16
c Virginis	5½	+0.09	+ 1.2	+ 3 55.9	19 44.4	− 7 49.0	+0.0848	0.5280	−0.2198	+43	−34
AUGUST.											
B. A. C. 4254	6	+0.17	+ 1.0	+ 2 28.0	**1** 4 44.3	+ 0 54.3	−0.3538	0.5288	−0.2227	+20	−60
80 Virginis	6	0.48	− 0.6	− 4 49.8	**2** 8 52.6	+ 4 10.3	+0.9945	0.5359	0.2233	+85	+17
88 Virginis	6½	0.57	0.9	6 17.0	15 2.4	+10 8.3	+1.1330	0.5384	0.2213	+84	+28
ξ^1 Libræ	6	0.95	1.5	11 26.7	**3** 21 50.7	− 8 4.3	−0.1042	0.5547	0.2015	+29	−45
ξ^2 Libræ	5½	+0.98	− 1.3	−10 57.7	22 55.5	− 7 1.6	−0.8156	0.5547	−0.2002	−10	−90
o^2 Libræ	6½	1.13	2.0	14 44.3	**4** 10 32.7	+ 4 11.5	+0.7877	0.5631	0.1870	+75	+ 5
γ Libræ	4½	1.20	1.5	14 25.1	15 59.1	+ 9 26.3	−0.5373	0.5678	0.1797	+ 4	−74
η Libræ	6	1.26	1.5	15 19.1	19 39.1	−11 1.6	−0.2725	0.5707	0.1748	+17	−55
θ Libræ	4½	1.31	1.6	16 24.2	23 46.6	− 7 3.1	+0.1198	0.5723	0.1685	+37	−32
49 Libræ	6	+1.37	− 1.3	−16 12.3	**5** 2 33.8	− 4 22.1	−0.5429	0.5751	−0.1639	+ 2	−75
χ Ophiuchi	4½	1.53	− 1.1	18 12.3	13 33.7	+ 6 13.1	−0.2215	0.5831	0.1443	+16	−52
ξ Ophiuchi	5	1.84	+ 0.1	20 59.6	**6** 11 0.6	+ 2 49.7	−0.0466	0.5977	0.0982	+21	−42
58 Ophiuchi	5½	1.95	1.0	21 37.7	19 40.6	+11 8.7	−0.1728	0.6035	0.0771	+12	−49
JUPITER				23 23.6	**7** 2 41.7	− 6 7.4	+1.1040	0.6095	0.0589	+67	+32
P. xvii, 330	5½	+2.06	+ 1.7	−23 8.4	3 20.2	− 5 30.5	+0.8128	0.6060	−0.0576	+67	+ 9
P. xvii, 334	5½	2.06	1.7	22 50.3	3 27.4	− 5 23.6	+0.5066	0.6060	0.0569	+50	−10
B. A. C 6161	5½	2.09	1.9	23 43.4	6 23.1	− 2 35.1	+1.2315	0.6081	0.0490	+66	+49
14 Sagittarii	6	2.08	2.3	21 44.3	7 22.8	− 1 37.9	−0.7882	0.6087	0.0463	−25	−90
28 Sagittarii	5½	2.20	3.8	22 30.3	19 23.7	+ 9 52.9	−0.3885	0.6125	0.0135	− 6	−64
ν^1 Sagittarii	5	+2.23	+ 4.2	−22 52.7	22 18.5	−11 19.7	−0.0479	0.6130	−0.0053	+12	−42
ν^2 Sagittarii	5	2.23	4.0	22 48.5	22 39.6	−10 59.4	−0.1173	0.6130	−0.0050	+ 9	−46
o Sagittarii	3½	2.23	4.8	21 54.1	**8** 2 14.5	− 7 33.6	−1.0150	0.6130	+0.0056	−42	−90
η Capricorni	5	2.37	10.8	20 17.4	**9** 23 35.8	+11 55.1	+0.4262	0.5997	0.1241	+51	−15
30 Capricorni	5½	2.35	11.5	18 26.8	**10** 4 57.0	− 6 56.4	−0.7114	0.5948	0.1361	−11	−90
γ Capricorni	3½	+2.31	+12.2	−17 9.6	13 48.3	+ 1 34.1	−0.7104	0.5919	+0.1536	−10	−90
δ Capricorni	2½	2.30	12.4	16 37.6	16 37.5	+ 4 16.8	−0.8050	0.5878	0.1589	−15	−90
74 Aquarii	6	2.15	13.9	12 12.3	**11** 20 41.2	+ 7 18.5	−0.1652	0.5661	0.2001	+25	−48
ψ^1 Aquarii	4	2.07	14.1	9 41.3	**12** 6 36.3	− 7 7.4	−0.6842	0.5598	0.2102	− 2	−89
ψ^2 Aquarii	4	2.07	14.0	9 47.2	7 31.7	− 6 13.8	−0.3887	0.5585	0.2109	+15	−62
ψ^3 Aquarii	4½	+2.07	+14.1	−10 12.9	8 0.2	− 5 46.3	+0.1460	0.5581	+0.2113	+44	−31
30 Piscium	4½	1.91	13.9	6 37.7	**13** 3 48.7	−10 37.7	+0.7921	0.5457	0.2230	+83	+ 4
33 Piscium	4½	1.90	13.9	6 19.5	5 24.5	− 9 5.1	+0.8364	0.5450	0.2237	+84	+ 7
B. A. C. 17	6	1.89	13.9	5 51.6	7 45.7	− 6 48.4	+0.8845	0.5430	0.2241	+84	+10
15 Ceti	6½	1.81	12.6	1 6.7	21 5.3	+ 6 5.6	−1.0390	0.5359	0.2260	−20	−90
20 Ceti	5	+1.73	+12.7	− 1 44.7	**14** 4 22.9	−10 50.4	+1.2725	0.5329	+0.2257	+88	+41
26 Ceti	6	1.69	11.8	+ 0 46.5	9 41.4	− 5 41.8	−0.1716	0.5311	0.2251	+30	−49
29 Ceti	6½	1.67	11.6	1 24.9	11 45.1	− 3 42.0	−0.3800	0.5297	0.2243	+19	−62
33 Ceti	6	1.66	11.5	1 51.5	13 1.9	− 2 27.5	−0.5597	0.5297	0.2242	+ 9	−74
35 Ceti	6½	1.65	11.6	1 53.3	14 0.6	− 1 30.6	−0.3719	0.5290	0.2237	+19	−61
f Piscium	5	+1.63	+11.1	+ 3 2.0	16 37.5	+ 1 1.4	−0.9947	0.5285	+0.2232	−17	−87
ν Piscium	4½	1.54	10.1	4 55.8	**15** 4 26.8	−11 31.0	−0.3982	0.5256	0.2181	+18	−62
64 Ceti	5½	1.42	8.7	8 3.1	19 32.1	+ 3 7.0	−0.5072	0.5234	0.2088	+12	−68
ξ^1 Ceti	4½	1.42	8.5	8 19.6	20 21.6	+ 3 55.0	−0.6287	0.5234	0.2084	+ 5	−78
B. A. C. 755	6½	1.36	7.7	10 3.9	**16** 3 18.6	+10 39.5	−1.0700	0.5234	0.2032	−23	−80
B. A. C. 830	6	+1.29	+ 7.2	+10 16.1	11 16.9	− 5 36.6	+0.3009	0.5234	+0.1960	+57	−22
μ Ceti	4½	+1.28	+ 7.3	+ 9 38.8	12 31.1	− 4 24.6	+1.2120	0.5230	+0.1950	+90	+39

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"	° '	d h m	h m				°	°
Lalande 5725	6	+1.20	+5.8	+12 45.8	16 23 20.7	+ 6 5.4	-0.1105	0.5238	+0.1841	+33	-40
B. A. C. 1119	6	1.05	4.0	16 10.6	17 15 53.6	- 1 51.9	-0.9491	0.5268	0.1646	-16	-74
B. A. C. 1206	6	1.00	3.3	16 59.9	22 43.6	+ 4 45.6	-0.7588	0.5282	0.1558	- 4	-67
B. A. C. 1240	6	0.96	2.9	17 52.9	18 2 30.5	+ 8 25.6	-1.1500	0.5289	0.1506	-33	-72
B. A. C. 1272	6	0.92	2.9	17 2.6	6 5.3	+11 53.7	+0.3004	0.5292	0.1451	+57	-14
δ^1 Tauri	4	+0.86	+2.3	+17 16.9	13 26.8	- 4 58.4	+1.0700	0.5310	+0.1345	+90	+35
δ^2 Tauri	5½	0.86	2.4	17 11.1	14 1.1	- 4 25.2	+1.2510	0.5310	0.1335	+90	+56
δ^3 Tauri	5	0.85	2.2	17 40.4	14 41.6	- 3 46.0	+0.8056	0.5310	0.1326	+90	+16
ε Tauri	3½	0.84	1.8	18 56.0	16 12.1	- 2 18.3	-0.3828	0.5310	0.1301	+18	-50
B. A. C. 1468	6½	0.74	1.4	18 31.9	19 0 50.1	+ 6 3.4	+1.1270	0.5348	0.1168	+90	+41
i Tauri	5½	+0.72	+1.3	+18 39.0	3 18.5	+ 8 27.1	+1.2800	0.5350	+0.1129	+90	+60
ι Tauri	5	0.67	0.4	21 25.8	8 55.0	-10 7.1	-1.1860	0.5360	0.1032	-40	-69
l Tauri	5½	0.64	0.6	20 16.2	11 13.2	- 7 53.2	+0.3303	0.5374	0.0996	+59	- 8
105 Tauri	6	0.65	+0.3	21 33.5	11 14.7	- 7 51.8	-1.0940	0.5374	0.0996	-30	-68
n Tauri	5½	0.60	-0.2	21 58.9	16 41.2	- 2 35.7	-1.0460	0.5386	0.0899	-26	-68
o Tauri	6	+0.56	-0.2	+21 50.4	20 41.3	+ 1 16.7	-0.5444	0.5395	+0.0830	+ 8	-56
ζ Tauri	3½	0.51	0.2	21 4.4	20 1 28.5	+ 5 54.6	+0.6810	0.5407	0.0738	+90	+15
141 Tauri	6½	0.41	0.8	22 23.9	12 49.6	- 7 6.4	-0.0683	0.5434	0.0526	+35	-23
1 Geminorum	5	0.40	1.0	23 16.2	13 56.9	- 6 1.3	-0.9743	0.5437	0.0506	-20	-67
3 Geminorum	6½	0.38	1.0	23 7.8	16 35.5	- 3 27.9	-0.6937	0.5444	0.0456	- 1	-65
6 Geminorum	6½	+0.37	-1.0	+22 55.9	17 48.8	- 2 17.0	-0.4189	0.5445	+0.0432	+15	-44
η Geminorum	3½	0.36	1.0	22 32.3	19 1.7	- 1 6.5	+0.0664	0.5448	0.0410	+43	-15
μ Geminorum	3	0.31	1.1	22 34.2	22 48.4	+ 2 32.8	+0.1716	0.5457	0.0333	+49	- 9
d Geminorum	6	0.19	1.2	21 53.5	21 12 10.3	- 8 31.7	+1.1920	0.5483	+0.0065	+90	+58
44 Geminorum	6	0.15	1.5	22 48.2	18 32.8	- 2 21.9	+0.1860	0.5483	-0.0059	+50	- 6
δ Geminor. *mult.*	3½	+0.08	-1.4	+22 11.1	22 1 26.4	+ 4 17.9	+0.7773	0.5495	-0.0203	+90	+26
58 Geminorum	6½	0.07	1.5	23 9.4	2 58.2	+ 5 46.6	-0.3279	0.5499	0.0225	+20	-35
63 Geminor. *mult.*	5½	+0.06	1.4	21 40.3	4 59.2	+ 7 43.6	+1.2620	0.5500	0.0270	+90	+65
82 Geminorum	6½	-0.02	1.5	23 24.8	14 36.4	- 6 58.3	-1.0150	0.5500	0.0467	-24	-67
84 Geminorum	6½	0.03	1.4	22 37.1	16 41.6	- 4 57.3	-0.2386	0.5507	0.0508	+25	-33
7 Cancri	6½	-0.05	-1.2	+22 22.9	21 43.8	- 0 5.2	-0.2587	0.5499	-0.0607	+24	-35
μ^1 Cancri	6½	0.06	1.3	22 57.1	22 51.6	+ 1 0.4	-0.9561	0.5496	0.0630	-19	-67
μ^2 Cancri	5½	0.06	1.2	21 54.2	23 33.7	+ 1 41.0	+0.1523	0.5496	0.0643	+48	-12
B. A. C. 2788	6	0.11	0.9	21 5.9	23 5 26.0	+ 7 21.8	+0.6282	0.5490	0.0760	+86	+12
η Cancri	5½	0.14	0.8	20 49.0	11 12.8	-11 2.9	+0.4663	0.5484	0.0868	+70	+ 2
39 Cancri	6½	-0.16	-0.7	+20 23.9	14 40.8	- 7 41.7	+0.6125	0.5484	-0.0933	+84	+ 9
40 Cancri	6½	0.16	0.7	20 21.7	14 43.2	- 7 39.4	+0.6509	0.5484	0.0933	+88	+11
ε Cancri	6½	0.16	0.7	19 56.3	14 50.9	- 7 32.0	+1.1010	0.5471	0.0935	+90	+41
γ Cancri	4½	0.16	-0.8	21 52.1	16 8.9	- 6 16.6	-1.1370	0.5474	0.0960	-34	-68
				NEW	*MOON.*						
c Virginis	5½	-0.09	+1.4	+ 3 55.9	28 1 34.9	- 0 11.1	-0.0440	0.5323	-0.2229	+37	-41
B. A. C. 4254	6	-0.03	1.4	+ 2 28.0	10 29.6	+ 8 27.1	-0.4983	0.5326	0.2257	+12	-70
80 Virginis	6	+0.18	0.5	- 4 49.8	29 14 24.3	+11 29.3	+0.8194	0.5376	0.2250	+85	+ 6
88 Virginis	6½	0.25	+0.3	6 17.0	20 32.6	- 6 34.1	+0.9548	0.5398	0.2230	+84	+14
94 Virginis	6½	+0.33	-0.1	- 8 21.7	30 5 5.6	+ 1 42.4	+1.2190	0.5421	-0.2186	+82	+35
ξ^1 Libræ	6	0.56	0.3	11 26.7	31 3 23.8	- 0 43.8	-0.3019	0.5529	0.2010	+19	-57
ξ^2 Libræ	5½	0.57	0.2	10 57.7	4 29.0	+ 0 19.3	-1.0170	0.5537	0.2002	-23	-90
o^1 Libræ	6½	0.72	0.9	15 8.8	15 18.5	+10 46.5	+1.1790	0.5594	0.1877	+75	+34
o^2 Libræ	6½	0.72	0.8	14 44.3	16 12.4	+11 38.5	+0.5930	0.5601	0.1863	+69	- 7
γ Libræ	4½	+0.79	-0.6	-14 25.1	21 42.6	- 7 2.9	-0.7387	0.5636	-0.1791	- 8	-90

SEPTEMBER.

Name.	Mag.	Δα	Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
η Libræ	6	+0.84	-0.7	-15 19.1	1 1 25.6	- 3 27.7	-0.4735	0.5654	-0.1734	+ 7	-69
θ Libræ	4½	+0.90	-0.8	-16 24.2	5 36.9	+ 0 34.6	-0.0765	0.5678	-0.1671	+26	-43
49 Libræ	6	+0.95	-0.6	-16 12.3	8 26.6	+ 3 18.2	-0.7447	0.5698	-0.1624	-10	-90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
χ Ophiuchi	4½	+1.11	- 0.5	-18 12.3	1 19 38.9	- 9 54.2	-0.4170	0.5769	-0.1428	+ 7	-65
ξ Ophiuchi	5	1.45	+ 0.2	20 59.6	2 17 35.7	+11 12.3	-0.2277	0.5897	0.0967	+11	-53
58 Ophiuchi	5½	1.57	0.7	21 37.7	3 2 29.6	- 4 14.7	-0.3484	0.5944	0.0750	+ 3	-61
JUPITER				23 26.8	9 10.6	+ 2 10.4	+1.0370	0.5958	0.0582	+67	+25
P. xvii, 330	5½	1.71	1.1	23 8.4	10 22.4	+ 3 19.3	+0.6604	0.5974	0.0559	+62	- 1
P. xvii, 334	5½	+1.71	+ 1.1	-22 50.3	10 29.6	+ 3 26.2	+0.3495	0.5974	-0.0551	+39	-19
B. A. C. 6161	5½	1.76	1.2	23 43.4	13 13.0	+ 6 2.3	+1.0530	0.5988	0.0476	+66	+27
14 Sagittarii	6	1.75	1.7	21 44.3	14 32.2	+ 7 19.1	-0.9596	0.5988	0.0448	-36	-90
24 Sagittarii	6	1.87	2.2	24 6.8	22 5.1	- 9 26.3	+1.1660	0.6015	0.0252	+66	+39
B. A. C. 6343	6½	1.90	2.6	23 35.9	23 52.7	- 7 43.0	+0.6074	0.6019	0.0203	+55	- 4
26 Sagittarii	6½	+1.92	+ 2.6	-23 56.2	4 1 9.5	- 6 29.4	+0.9245	0.6019	-0.0167	+66	+17
28 Sagittarii	5½	1.92	3.1	22 30.3	2 54.7	- 4 48.5	-0.5420	0.6027	0.0122	-13	-77
30 Sagittarii	6½	1.94	3.3	22 17.2	4 38.9	- 3 8.5	-0.7789	0.6025	0.0075	-27	-90
31 Sagittarii	6½	1.95	3.4	22 2.9	5 9.0	- 2 39.6	-1.0220	0.6025	0.0062	-44	-90
ν^1 Sagittarii	5	1.96	3.3	22 52.7	5 55.0	- 1 55.5	-0.1910	0.6025	0.0042	+ 5	-51
ν^2 Sagittarii	5	+1.97	+ 3.4	-22 48.5	6 16.7	- 1 34.6	-0.2630	0.6025	-0.0030	+ 2	-55
B. A. C. 6448	6½	1.98	3.3	23 18.8	6 36.9	- 1 15.2	+0.2429	0.6025	-0.0022	+29	-25
ο Sagittarii	3½	2.00	4.0	21 54.1	9 58.2	+ 1 57.9	-1.1690	0.6030	+0.0067	-56	-90
50 Sagittarii	6	2.10	5.0	21 59.6	18 16.8	+ 9 56.2	-0.9264	0.6036	0.0292	-35	-90
53 Sagittarii	6½	2.17	5.3	23 40.6	23 26.7	- 9 6.4	+0.9484	0.6033	0.0428	+66	+19
B. A. C. 6727	6	+2.17	+ 5.3	-23 40.8	23 33.5	- 9 0.0	+0.9598	0.6033	+0.0432	+66	+19
4 Capricorni	6	2.29	7.5	22 9.0	5 14 15.8	+ 5 6.6	+0.3384	0.5999	0.0811	+41	-20
17 Capricorni	6	2.34	8.9	21 54.9	6 1 19.3	- 8 16.2	+1.1520	0.5950	0.1080	+68	+36
20 Capricorni	6½	2.35	9.7	19 27.7	6 42.0	- 3 6.2	-0.7001	0.5923	0.1199	-12	-90
η Capricorni	5	2.37	9.9	20 17.4	8 36.6	- 1 16.1	+0.3652	0.5913	0.1244	+46	-18
30 Capricorni	5½	+2.39	+10.6	-18 26.8	14 5.2	+ 3 59.8	-0.7736	0.5889	+0.1366	-15	-90
γ Capricorni	3½	2.40	11.7	17 9.6	23 7.7	-11 18.5	-0.7546	0.5835	0.1543	-12	-90
δ Capricorni	2½	2.41	12.0	16 37.6	7 2 0.1	- 8 32.6	-0.8420	0.5816	0.1597	-17	-90
29 Aquarii *mult.*	6½	2.42	12.7	17 29.7	8 25.6	- 2 21.5	+1.0970	0.5781	0.1708	+73	+28
39 Aquarii	6½	2.42	13.1	14 44.2	12 40.5	+ 1 44.0	-0.9493	0.5749	0.1774	-22	-90
ψ^1 Aquarii	4	+2.40	+15.1	- 9 41.3	8 16 26.0	+ 4 30.4	-0.6343	0.5580	+0.2118	+ 3	-83
ψ^2 Aquarii	4	2.40	15.1	9 47.2	17 21.7	+ 5 24.2	-0.3373	0.5580	0.2129	+18	-59
ψ^3 Aquarii	4½	2.40	15.2	10 12.9	17 50.2	+ 5 51.7	+0.2028	0 5580	0.2133	+48	-28
30 Piscium	4½	2.34	15.8	6 37.6	9 13 39.5	+ 1 1.2	+0.8882	0.5475	0.2256	+83	+10
33 Piscium	4½	2.33	15.8	- 6 19.4	15 15.0	+ 2 33.6	+0.9363	0.5463	0.2261	+84	+13
f Piscium	5	+2.21	+14.3	+ 3 2.0	11 2 10.0	-11 38.1	-0.8230	0.5334	+0.2268	- 6	-87
ν Piscium	4½	2.16	13.4	4 55.8	13 49.3	- 0 20.5	-0.2060	0.5307	0.2217	+28	-50
64 Ceti	5½	2.10	12.2	8 3.2	12 4 40.4	- 9 56.8	-0.2949	0.5290	0.2127	+23	-54
ξ^1 Ceti	4½	2.10	12.1	8 19.7	5 29.1	- 9 9.5	-0.4159	0.5288	0.2117	+17	-62
ξ Arietis	5½	2.07	11.3	10 6.6	11 21.0	- 3 28.5	-1.0910	0.5286	0.2074	-24	-80
B. A. C. 755	6½	+2.06	+11.2	+10 4.0	12 19.2	- 2 32.0	-0.8449	0.5284	+0.2063	- 8	-80
B. A. C. 830	6	2.02	10.7	10 16.2	20 9.5	+ 5 3.9	+0.5260	0.5282	0.1990	+73	- 8
38 Arietis	5	2.02	10.2	11 58.9	21 21.4	+ 6 13.6	-1.0750	0.5276	0.1978	-24	-78
Lalande 5725	6	1.95	9.3	12 45.9	13 8 1.0	- 7 26.4	+0.1276	0.5284	0.1863	+46	-27
B. A. C. 1119	6	1.84	7.1	16 10.6	14 0 18.0	+ 8 20.3	-0.6939	0.5308	0.1665	+ 1	-74
B. A. C. 1206	6	+1.80	+ 6.3	+16 59.9	7 2.0	- 9 8.2	-0.5000	0.5319	+0.1571	+11	-60
B. A. C. 1240	6	1.78	5.8	17 52.9	10 45.8	- 5 31.4	-0.8890	0.5326	0.1522	-12	-72
B. A. C. 1272	6	1.73	5.6	17 2.7	14 17.6	- 2 6.2	+0.5520	0.5326	0.1465	+76	0
δ^3 Tauri	5	1.67	4.8	17 40.5	22 47.5	+ 6 7.6	+1.0570	0.5350	0.1339	+90	+33
ε Tauri	3½	1.66	4.4	18 56.1	15 0 16.9	+ 7 34.2	-0.1279	0.5350	0.1316	+32	-35
W. iv, 650	6	+1.63	+ 3.5	+20 27.7	4 55.2	-11 56.1	-1.2140	0.5362	+0.1238	-42	-70
ι Tauri	5	1.52	2.3	21 25.8	16 49.9	- 0 24.5	-0.9266	0.5375	0.1035	-16	-69
l Tauri	5½	1.49	2.3	20 16.2	19 7.1	+ 1 48.4	+0.5847	0.5389	0.0996	+81	+ 7
105 Tauri	6	1.50	2.1	21 33.5	19 8.5	+ 1 49.7	-0.8366	0.5389	0.0996	-10	-68
108 Tauri	6½	1.46	1.6	22 9.5	22 43.4	+ 5 17.7	-1.1510	0.5394	0.0932	-36	-68
n Tauri	5½	+1.45	+ 1.4	+21 58.9	16 0 32.5	+ 7 3.3	-0.7905	0.5396	+0.0896	- 7	-68
ο Tauri	6	+1.41	+ 1.1	+21 50.4	4 31.0	+10 54.1	-0.2928	0.5412	+0.0824	+22	-39

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
ζ Tauri	3½	+1.36	+1.0	+21 4.4	16 9 16.8	- 8 29.3	+0.9284	0.5417	+0.0738	+90	+30
141 Tauri	6½	1.24	-0.2	22 23.9	20 35.1	+ 2 26.8	+0.1768	0.5433	0.0522	+50	-10
1 Geminorum	5	1.24	0.4	23 16.2	21 42.2	+ 3 31.7	-0.7293	0.5433	0.0501	- 3	-67
2 Geminorum	7	1.23	0.5	23 38.9	22 57.4	+ 4 44.5	-1.0860	0.5436	0.0475	-30	-66
3 Geminorum	6½	1.21	0.6	23 7.8	17 0 20.3	+ 6 4.6	-0.4494	0.5437	0.0449	+14	-46
6 Geminorum	6½	+1.19	-0.6	+22 55.9	1 33.4	+ 7 15.3	-0.1786	0.5439	+0.0424	+29	-29
η Geminorum	3½	1.18	0.6	22 32.3	2 46.2	+ 8 25.7	+0.3082	0.5449	0.0403	+58	- 2
9 Geminorum	6½	1.18	1.0	23 46.7	3 43.2	+ 9 20.9	-1.0280	0.5450	0.0387	-25	-66
μ Geminorum	3	1.14	0.8	22 34.2	6 32.8	-11 55.1	+0.4115	0.5454	+0.0327	+66	+ 5
44 Geminorum	3	0.92	2.0	22 48.2	18 2 17.2	+ 7 10.2	+0.4070	0.5467	-0.0070	+66	+ 7
δ Geminor. *mult.*	3½	+0.84	-2.1	+22 11.1	9 11.5	-10 9.2	+0.9908	0.5473	-0.0210	+90	+40
58 Geminorum	6½	0.83	2.4	23 9.4	10 43.6	- 8 40.2	-0.1160	0.5476	0.0239	+32	-23
82 Geminorum	6½	0.70	2.8	23 24.8	22 23.7	+ 2 36.7	-0.8181	0.5476	0.0478	- 9	-67
84 Geminorum	6½	0.68	2.7	22 37.1	19 0 29.3	+ 4 38.1	-0.0459	0.5467	0.0517	+36	-22
7 Cancri	6½	0.62	2.8	22 22.9	5 32.5	+ 9 31.3	-0.0697	0.5471	0.0617	+35	-24
μ¹ Cancri	6½	+0.61	-2.9	+22 57.1	6 40.6	+10 37.2	-0.7689	0.5473	-0.0640	- 6	-67
μ² Cancri	5½	0.60	2.8	21 54.2	7 22.6	+11 17.8	+0.3414	0.5473	0.0654	+61	- 4
B. A. C. 2788	6	0.54	2.8	21 5.9	13 16.0	- 7 0.6	+0.8041	0.5466	0.0769	+90	+22
η Cancri	5½	0.48	2.8	20 49.0	19 4.0	- 1 24.0	+0.6345	0.5459	0.0879	+87	+11
39 Cancri	6½	0.45	2.7	20 23.9	22 32.7	+ 1 57.9	+0.7755	0.5451	0.0942	+90	+18
40 Cancri	6½	+0.45	-2.7	+20 21.7	22 35.0	+ 2 0.1	+0.8120	0.5451	-0.0942	+90	+21
ε Cancri	6½	0.44	2.6	19 56.3	22 42.8	+ 2 7.6	+1.2630	0.5451	0.0949	+90	+60
γ Cancri	4½	0.44	3.0	21 52.1	20 0 1.0	+ 3 23.3	-0.9746	0.5451	0.0973	-19	-68
80 Cancri	6½	0.31	2.4	18 29.9	13 35.1	- 7 29.2	+1.2180	0.5430	0.1216	+90	+50
83 Cancri	5½	0.28	2.4	18 10.6	16 55.6	- 4 15.3	+1.1510	0.5433	0.1275	+90	+41
37 Leonis	5½	+0.09	-1.6	+14 16.9	21 20 34.2	- 1 30.1	+1.2120	0.5388	-0.1704	+90	+43
42 Leonis	6	0.07	1.6	15 32.1	23 3.0	+ 0 53.9	-0.5627	0.5388	0.1742	+ 8	-67
i Leonis	5½	0.04	-1.4	+14 42.3	22 4 4.1	+ 5 45.4	-0.5616	0.5383	0.1808	+ 9	-67
				NEW	*MOON.*						
ξ¹ Libræ	6	+0.23	+0.4	-11 26.7	27 9 22.2	+ 7 2.1	-0.5093	0.5582	-0.2046	+ 9	-72
ξ² Libræ	5½	0.24	+0.5	10 57.7	10 26.4	+ 8 4.2	-1.2200	0.5589	0.2036	-40	-90
σ³ Libræ	6½	0.35	0.0	14 44.3	21 58.5	- 4 47.9	+0.3651	0.5643	0.1890	+54	-19
ζ³ Libræ	6	0.39	-0.1	16 13.6	28 1 16.6	- 1 36.9	+1.2650	0.5663	0.1847	+74	+44
γ Libræ	4½	0.40	+0.3	14 25.1	3 24.1	+ 0 26.0	-0.9661	0.5680	0.1817	-22	-90
η Libræ	6	+0.44	+0.1	-15 19.1	7 4.1	+ 3 58.1	-0.7034	0.5697	-0.1758	- 7	-90
θ Libræ	4½	0.48	0.0	16 24.2	11 12.3	+ 7 57.3	-0.3153	0.5719	0.1691	+14	-58
49 Libræ	6	0.53	+0.1	16 12.3	14 0.3	+10 39.2	-0.9847	0.5736	0.1644	-25	-90
ν² Scorpii	4½	0.59	-0.2	19 10.3	18 49.7	- 8 42.0	+1.2570	0.5755	0.1557	+71	+46
ψ Ophiuchi	4½	0.65	-0.2	19 46.7	23 51.9	- 3 51.1	+1.1130	0.5786	0.1463	+70	+30
χ Ophiuchi	4½	+0.65	0.0	-18 12.3	29 1 6.2	- 2 39.7	-0.6631	0.5794	-0.1438	- 8	-89
ξ Ophiuchi	5	0.96	+0.4	20 59.6	22 58.3	- 5 37.8	-0.4814	0.5895	0.0966	- 3	-71
58 Ophiuchi	5½	1.08	0.8	21 37.7	30 7 53.4	+ 2 56.5	-0.6046	0.5933	0.0752	-11	-84
4 Sagittarii	5½	1.19	0.7	23 48.3	14 17.3	+ 9 5.1	+1.1700	0.5940	0.0590	+66	+39
P. xvii, 330	5½	1.21	1.0	23 8.4	15 48.6	+10 32.9	+0.4098	0.5946	0.0552	+43	-16
P. xvii, 334	5½	+1.20	+1.1	-22 50.3	15 56.0	+10 40.0	+0.0978	0.5946	-0.0548	+25	-33
JUPITER				23 30.2	17 57.2	-11 23.7	+0.6655	0.5913	0.0498	+62	- 1
B. A. C. 6161	5½	1.26	1.0	23 43.4	18 58.3	-10 24.9	+0.8381	0.5953	0.0472	+66	+10
14 Sagittarii	6	+1.25	+1.5	-21 44.3	20 0.4	- 9 25.4	-1.2175	0.5956	-0.0438	-58	-90

OCTOBER.

24 Sagittarii	6	+1.39	+1.7	-24 6.8	1 3 37.7	- 2 6.3	+0.9224	0.5965	-0.0243	+66	+16
25 Sagittarii	6½	1.40	1.7	24 18.4	3 52.9	- 1 51.8	+1.1130	0.5965	0.0238	+66	+33
B. A. C. 6343	6½	1.41	1.9	23 35.9	5 26.5	- 0 21.9	+0.3625	0.5970	0.0196	+37	-19
26 Sagittarii	6½	+1.43	+1.9	-23 56.2	6 44.2	+ 0 52.7	+0.6813	0.5967	-0.0162	+62	0
28 Sagittarii	5½	+1.44	+2.4	-22 30.4	8 30.7	+ 2 34.9	-0.7905	0.5977	-0.0113	-27	-90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
30 Sagittarii	6½	+1.46	+ 2.6	-22 17.3	1 10 16.4	+ 4 16.3	-1.0290	0.5977	-0.0069	-44	-90
ν¹ Sagittarii	5	1.48	2.5	22 52.8	11 33.5	+ 5 30.4	-0.4358	0.5977	0.0037	- 9	-68
ν² Sagittarii	5	1.48	2.6	22 48.6	11 55.5	+ 5 51.5	-0.5084	0.5977	0.0025	-12	-74
B. A. C. 6448	6½	1.50	2.5	23 18.9	12 16.1	+ 6 11.3	+0.0034	0.5977	-0.0017	+15	-39
χ³ Sagittarii	5½	1.67	3.3	24 10.7	23 45.5	- 6 46.9	+1.0340	0.5965	+0.0287	+66	+25
50 Sagittarii	6	+1.65	+ 3.9	-21 59.6	2 0 7.3	- 6 25.9	-1.1700	0.5965	+0.0296	-54	-90
53 Sagittarii	6½	1.73	3.9	23 40.6	5 23.1	- 1 22.8	+0.7280	0.5953	0.0436	+66	+ 3
B. A. C. 6727	6	1.74	4.0	23 40.8	5 30.3	- 1 16.1	+0.7381	0.5953	0.0439	+66	+ 4
4 Capricorni	6	1.92	5.9	22 9.0	20 31.4	-10 50.3	+0.1286	0.5912	0.0815	+28	-32
17 Capricorni	6	2.04	7.1	21 54.9	3 7 51.1	+ 0 3.1	+0.9645	0.5865	0.1080	+68	+19
20 Capricorni	6½	+2.08	+ 8.2	-19 27.8	13 22.0	+ 5 21.3	-0.8999	0.5834	+0.1198	-25	-90
η Capricorni	5	2.09	8.3	20 17.5	15 19.7	+ 7 14.5	+0.1830	0.5824	0.1241	+36	-29
27 Capricorni	6½	2.12	8.4	21 0.0	17 25.8	+ 9 15.8	+1.1690	0.5811	0.1288	+69	+36
30 Capricorni	5½	2.13	9.3	18 26.9	20 57.0	-11 20.9	-0.9612	0.5798	0.1361	-27	-90
γ Capricorni	3½	2.20	10.4	17 9.6	4 6 14.1	- 2 24.4	-0.9284	0.5744	0.1539	-23	-90
δ Capricorni	2½	+2.22	+10.7	-16 37.6	9 11.1	+ 0 26.1	-1.0120	0.5725	+0.1592	-28	-90
29 Aquarii *mult.*	6½	2.29	11.2	17 29.7	15 46.9	+ 6 47.5	+0.9642	0.5696	0.1704	+73	+17
39 Aquarii	6½	2.30	11.9	14 44.2	20 8.8	+11 0.1	-1.0990	0.5663	0.1772	-32	-90
50 Aquarii	6	2.33	12.4	14 5.4	5 1 24.6	- 7 55.4	-0.8087	0.5632	0.1849	-11	-90
74 Aquarii	6	2.38	13.6	12 12.3	14 22.2	+ 4 35.2	-0.2329	0.5567	0.2014	+23	-53
ψ¹ Aquarii	4	+2.41	+14.5	- 9 41.3	6 0 35.2	- 9 32.7	-0.7114	0.5514	+0.2117	- 3	-90
ψ² Aquarii	4	2.42	14.6	9 47.2	1 32.2	- 8 37.5	-0.4089	0.5507	0.2125	+15	-64
ψ³ Aquarii	4½	2.42	14.6	10 12.9	2 1.3	- 8 9.4	+0.1357	0.5504	0.2130	+44	-32
30 Piscium	4½	2.48	15.6	6 37.6	22 13.6	+11 23.1	+0.8806	0.5420	0.2261	+83	+ 9
33 Piscium	4½	2.48	15.6	6 19.4	23 50.6	-11 2.8	+0.9324	0.5412	0.2268	+84	+12
14 Ceti	6	+2.52	+16.0	- 1 6.6	7 14 24.3	+ 3 2.9	-1.1630	0.5369	+0.2309	-30	-90
26 Ceti	6	2.53	15.7	+ 0 46.6	8 4 14.4	- 7 32.9	+0.0525	0.5332	0.2305	+42	-36
f Piscium	5	2.55	15.5	3 2.1	11 8.0	- 0 52.2	-0.7422	0.5317	0.2287	- 1	-83
ν Piscium	4½	2.56	15.0	4 55.8	22 49.6	+10 27.7	-0.0952	0.5307	0.2242	+34	-44
64 Ceti	5½	2.56	14.0	8 3.2	9 13 40.4	+ 0 51.2	-0.1456	0.5303	0.2153	+31	-45
ξ¹ Ceti	4½	+2.56	+13.9	+ 8 19.7	14 28.8	+ 1 38.1	-0.2647	0.5301	+0.2147	+25	-53
ξ Arietis	5½	2.57	13.4	10 6.6	20 19.6	+ 7 18.1	-0.9253	0.5297	0.2097	-12	-80
38 Arietis	5	2.56	12.4	11 58.9	10 6 16.9	- 7 3.0	-0.8911	0.5309	0.2008	-10	-78
Lalande 5725	6	2.54	11.3	12 45.9	16 51.8	+ 3 12.2	+0.3321	0.5315	0.1892	+59	-17
B. A. C. 1119	6	2.50	9.2	16 10.7	11 9 0.1	- 5 9.7	-0.4629	0.5344	0.1690	+14	-59
B. A. C. 1206	6	+2.49	+ 8.4	+16 59.9	15 40.0	+ 1 17.7	-0.2590	0.5346	+0.1599	+25	-45
B. A. C. 1240	6	2.47	7.7	17 52.9	19 21.6	+ 4 52.3	-0.6406	0.5356	0.1544	+ 4	-69
B. A. C. 1272	6	2.44	7.5	17 2.7	22 51.3	+ 8 15.4	+0.8019	0.5365	0.1491	+90	+14
NEPTUNE				19 20.7	12 3 1.9	-11 42.0	-1.1030	0.5384	0.1427	-28	-71
ε Tauri	3½	2.44	6.1	18 56.1	8 44.5	- 6 10.3	+0.1369	0.5386	0.1336	+47	-21
W. iv, 650	6	+2.41	+ 5.3	+20 27.7	13 20.1	- 1 43.5	-0.9434	0.5386	+0.1255	-16	-70
ι Tauri	5	2.32	3.5	21 25.9	13 1 7.8	+ 9 41.2	-0.6503	0.5408	0.1050	+ 3	-65
l Tauri	5½	2.28	3.4	20 16.3	3 23.8	+11 52.9	+0.8606	0.5420	0.1006	+90	+23
105 Tauri	6	2.30	3.2	21 33.6	3 25.1	+11 54.1	-0.5578	0.5420	0.1006	+ 8	-58
108 Tauri	6½	2.28	2.7	22 9.5	6 58.3	- 8 39.6	-0.8680	0.5420	0.0943	-12	-68
n Tauri	5½	+2.27	+ 2.5	+21 58.9	8 46.6	- 6 54.8	-0.5065	0.5420	+0.0911	+11	-53
ο Tauri	6	2.24	2.0	21 50.4	12 43.3	- 3 5.8	-0.0054	0.5432	0.0836	+39	-23
ζ Tauri	3½	2.20	1.6	21 4.4	17 26.9	+ 1 28.5	+1.2130	0.5437	0.0740	+90	+54
B. A. C. 1801	6	2.20	1.0	23 9.1	20 3.9	+ 4 0.4	-0.8898	0.5438	0.0692	-13	-67
141 Tauri	6½	2.09	+ 0.1	22 23.9	14 4 41.1	-11 39.4	+0.4678	0.5446	0.0527	+71	+ 6
1 Geminorum	5	+2.09	- 0.2	+23 16.2	5 47.9	-10 34.8	-0.4383	0.5446	+0.0507	+15	-46
2 Geminorum	7	2.08	0.5	23 38.9	7 3.0	- 9 22.1	-0.7936	0.5449	0.0479	- 7	-66
3 Geminorum	6½	2.06	0.5	23 7.8	8 25.4	- 8 2.4	-0.1584	0.5450	0.0451	+30	-27
6 Geminorum	6½	2.04	0.6	22 55.9	9 38.2	- 6 52.1	+0.1160	0.5450	0.0433	+46	-13
η Geminorum	3½	2.02	0.7	22 32.3	10 50.7	- 5 42.0	+0.6005	0.5450	0.0404	+84	+14
9 Geminorum	6½	+2.03	- 1.0	+23 46.7	11 47.6	- 4 46.9	-0.7330	0.5450	+0.0386	- 3	-66
μ Geminorum	3	+2.00	- 1.1	+22 34.2	14 36.4	- 2 3.6	+0.7049	0.5459	+0.0332	+90	+20

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x′	y′	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
ω Geminorum	5½	+1.81	-3.3	+24 22.2	15 8 56.7	- 8 19.8	-1.0260	0.5463	-0.0042	-25	-66
44 Geminorum	6	1.78	3.1	22 48.1	10 19.8	- 6 59.4	+0.7012	0.5463	0.0070	+90	+23
48 Geminorum	6	1.76	3.7	24 18.8	13 37.1	- 3 48.7	-1.0060	0.5461	0.0138	-23	-66
58 Geminorum	6½	1.67	4.0	23 9.3	18 47.2	+ 1 11.1	+0.1768	0.5449	0.0243	+50	- 8
82 Geminorum	6½	1.53	4.9	23 24.7	16 6 30.2	-11 29.0	-0.5304	0.5449	0.0479	+ 9	-52
84 Geminorum	6½	+1.50	-4.8	+22 37.0	8 36.4	- 9 26.9	+0.2450	0.5448	-0.0521	+54	- 7
7 Cancri	6½	1.45	5.1	22 22.8	13 41.4	- 4 32.0	+0.2151	0.5438	0.0620	+52	- 9
μ¹ Cancri	6½	1.43	5.3	22 57.0	14 50.0	- 3 25.6	-0.4854	0.5438	0.0642	+12	-50
μ² Cancri	5½	1.42	5.1	21 54.1	15 32.4	- 2 44.6	+0.6251	0.5436	0.0655	+86	+12
B. A. C. 2788	6	1.34	5.2	21 5.8	21 28.4	+ 2 59.7	+1.0860	0.5426	0.0770	+90	+41
η Cancri	5½	+1.26	-5.4	+20 48.9	17 3 19.2	+ 8 39.0	+0.9139	0.5426	-0.0880	+90	+28
39 Cancri	6½	1.22	5.4	20 23.8	6 49.7	-11 57.3	+1.0520	0.5414	0.0947	+90	+37
40 Cancri	6½	1.22	5.4	20 21.6	6 52.0	-11 55.1	+1.0880	0.5414	0.0947	+90	+40
γ Cancri	4½	1.21	5.8	21 52.0	8 18.8	-10 31.2	-0.7069	0.5414	0.0971	- 1	-68
η Leonis	3½	0.71	5.6	17 18.1	19 0 44.9	+ 4 37.2	-1.0640	0.5350	0.1642	-24	-73
42 Leonis	6	+0.64	-5.1	+15 32.0	7 50.3	+11 29.1	-0.3554	0.5338	-0.1743	+20	-53
i Leonis	5½	0.59	4.9	14 42.2	12 54.2	- 7 36.5	-0.3620	0.5338	0.1811	+20	-53
ω Virginis	6	0.32	3.3	8 44.8	20 21 27.6	- 0 4.2	-0.5123	0.5331	0.2159	+12	-69
ν Virginis	4	0.30	3.1	7 9.0	21 1 5.8	+ 3 27.2	+0.4843	0.5323	0.2186	+69	-12
c Virginis	5½	0.21	-2.3	+ 3 55.9	17 58.2	- 4 12.2	-0.0315	0.5394	0.2309	+38	-40
				NEW	*MOON.*						
γ Libræ	4½	+0.22	+0.3	-14 25.1	25 10 57.8	+ 9 47.4	-1.1030	0.5755	-0.1861	-31	-90
η Libræ	6	0.24	0.3	15 19.1	14 31.9	-10 46.4	-0.8527	0.5781	0.1806	-15	-90
θ Libræ	4½	0.26	0.2	16 24.2	18 33.2	- 6 54.2	-0.4757	0.5805	0.1739	+ 6	-70
49 Libræ	6	+0.29	+0.4	-16 12.3	21 16.5	- 4 17.0	-1.1400	0.5813	-0.1689	-37	-90
ν² Scorpii	4½	0.33	0.2	19 10.3	26 1 57.9	+ 0 13.8	+1.0650	0.5845	0.1599	+71	+25
ψ Ophiuchi	4½	0.36	0.3	19 46.7	6 51.6	+ 4 56.2	+0.9128	0.5878	0.1505	+70	+13
χ Ophiuchi	4½	0.36	0.5	18 12.3	8 3.8	+ 6 5.6	-0.8443	0.5885	0.1480	-18	-90
ξ Ophiuchi	5	0.58	0.7	20 59.6	27 5 20.4	+ 2 31.8	-0.6944	0.5973	0.0994	-14	-90
58 Ophiuchi	5½	+0.68	+1.0	-21 37.7	14 2.0	+10 52.5	-0.8247	0.5997	-0.0770	-23	-90
4 Sagittarii	5½	0.76	0.9	23 48.3	20 17.1	- 7 7.6	+0.9264	0.6017	0.0607	+66	+16
P. xvii, 330	5½	0.78	1.0	23 8.4	21 46.2	- 5 42.2	+0.1722	0.6017	0.0573	+29	-30
P. xvii, 334	5½	0.78	1.1	22 50.3	21 53.5	- 5 35.2	-0.1371	0.6020	0.0565	+12	-48
B. A. C. 6161	5½	0.82	1.1	23 43.4	28 0 51.7	- 2 44.1	+0.5953	0.6023	0.0485	+56	- 5
Jupiter				-23 28.5	6 20.8	+ 2 31.5	+0.1206	0.5958	-0.0336	+24	-33
24 Sagittarii	6	+0.94	+1.4	24 6.8	9 20.7	+ 5 24.1	+0.6751	0.6032	0.0255	+61	- 1
25 Sagittarii	6½	0.94	1.4	24 18.4	9 35.6	+ 5 38.3	+0.8628	0.6032	0.0246	+66	+12
B. A. C. 6343	6½	0.96	1.6	23 35.9	11 7.5	+ 7 6.5	+0.1156	0.6027	0.0204	+23	-33
26 Sagittarii	6½	0.98	1.6	23 56.2	12 23.8	+ 8 19.7	+0.4322	0.6027	0.0167	+41	-15
28 Sagittarii	5½	+0.99	+2.0	-22 30.4	14 8.5	+10 0.1	-1.0300	0.6025	-0.0126	-43	-90
ν¹ Sagittarii	5	1.03	2.1	22 52.8	17 8.2	-11 7.5	-0.6813	0.6025	0.0042	-22	-90
ν² Sagittarii	5	1.04	2.1	22 48.6	17 29.9	-10 46.7	-0.7516	0.6025	0.0030	-26	-90
B. A. C. 6448	6½	1.04	2.0	23 18.9	17 50.1	-10 27.3	-0.2450	0.6025	-0.0022	+ 2	-55
χ² Sagittarii	6½	1.19	2.5	24 37.7	29 5 6.7	+ 0 21.8	+1.2260	0.5994	+0.0286	+65	+48
χ³ Sagittarii	5½	+1.19	+2.6	-24 10.8	5 10.3	+ 0 25.2	+0.7764	0.5994	+0.0286	+66	+ 6
53 Sagittarii	6½	1.26	3.1	23 40.6	10 44.1	+ 5 45.5	+0.4713	0.5980	0.0430	+46	-13
B. A. C. 6727	6	1.26	3.1	23 40.8	10 50.9	+ 5 52.1	+0.4780	0.5979	0.0438	+47	-12
4 Capricorni	6	1.45	4.6	22 9.0	30 1 46.7	- 3 47.7	-0.1283	0.5911	0.0816	+15	-47
17 Capricorni	6	1.50	5.6	21 54.9	13 5.9	+ 7 5.2	+0.7119	0.5847	0.1085	+68	+ 1
20 Capricorni	6½	+1.63	+6.6	-19 27.8	18 37.7	-11 35.7	-1.1510	0.5808	+0.1207	-44	-90
η Capricorni	5	1.67	6.5	20 17.5	20 35.6	- 9 42.3	-0.0679	0.5793	0.1243	+23	-43
27 Capricorni	6½	1.71	6.5	21 0.0	22 42.6	- 7 40 0	+0.9234	0.5788	0.1284	+69	+18
γ Capricorni	3½	1.82	8.5	17 9.7	31 11 37.0	+ 4 45.8	-1.1720	0.5697	0.1536	-41	-90
κ Capricorni	5	1.85	8.0	19 22.2	12 41.5	+ 5 47.8	+1.2540	0.5694	0.1552	+71	+45
δ Capricorni	2½	+1.85	+8.8	-16 37.7	14 35.9	+ 7 38.2	-1.2545	0.5685	+0.1590	-51	-90
29 Aquarii *mult*	6½	+1.94	+9.0	-17 29.7	21 16.6	- 9 53.5	+0.7345	0.5639	+0.1698	+72	+ 1

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0. Δα	Red'ns from 1889.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		s	″	° ′	d h m	h m				°	°
50 Aquarii	6	+2.02	+10.5	-14 5.4	1 7 3.0	- 0 29.7	-1.0340	0.5577	+0.1847	-26	-90
B. A. C. 7835	6½	2.04	10.8	13 28.8	9 32.8	+ 1 54.9	-1.1990	0.5558	0.1876	-40	-90
56 Aquarii	6½	2.05	10.3	15 8.9	9 39.6	+ 2 1.5	+0.5429	0.5558	0.1878	+66	-10
τ^2 Aquarii	4	2.12	11.1	14 10.6	18 26.5	+10 30.5	+1.2400	0.5505	0.1988	+76	+39
74 Aquarii	6	2.13	11.8	12 12.3	20 14.4	-11 45.2	-0.4396	0.5494	0.2005	+12	-67
ψ^1 Aquarii	4	+2.21	+12.8	- 9 41.3	2 6 39.6	- 1 40.7	-0.9049	0.5438	+0.2108	-14	-90
ψ^2 Aquarii	4	2.22	12.7	9 47.2	7 37.7	- 0 44.5	-0.5701	0.5436	0.2114	+ 7	-77
ψ^3 Aquarii	4½	2.22	12.6	10 12.9	8 7.3	- 0 15.9	-0.0502	0.5436	0.2123	+34	-42
B. A. C. 8274	7	2.33	13.8	6 59.6	22 15.5	-10 35.0	-0.3328	0.5374	0.2221	+20	-59
30 Piscium	4½	2.38	14.0	6 37.7	3 4 46.0	- 4 17.0	+0.7415	0.5348	0.2252	+81	0
33 Piscium	4½	+2.39	+14.0	- 6 19.5	6 25.2	- 2 40.9	+0.7974	0.5339	+0.2260	+84	+ 4
B. A. C. 17	6	2.40	14.1	5 51.6	8 51.3	- 0 19.3	+0.8636	0.5337	0.2271	+84	+ 8
15 Ceti	6½	2.51	15.1	- 1 6.7	22 33.9	-11 2.2	-0.9910	0.5298	0.2304	-16	-90
26 Ceti	6	2.58	15.2	+ 0 46.6	4 11 24.7	+ 1 25.0	-0.0264	0.5270	0.2300	+38	-41
29 Ceti	6½	2.60	15.2	1 25.0	13 30.3	+ 3 26.8	-0.2240	0.5264	0.2296	+28	-52
33 Ceti	6	+2.61	+15.3	+ 1 51.6	14 48.0	+ 4 42.2	-0.3975	0.5267	+0.2296	+19	-63
35 Ceti	6½	2.61	15.2	1 53.4	15 47.6	+ 5 40.0	-0.1996	0.5267	0.2293	+29	-52
f Piscium	5	2.63	15.2	3 2.1	18 26.2	+ 8 13.7	-0.8089	0.5268	0.2289	- 4	-87
ν Piscium	4½	2.71	15.0	4 55.8	5 6 19.8	- 4 14.4	-0.1261	0.5268	0.2246	+33	-46
64 Ceti	5½	2.79	14.2	8 3.2	21 22.9	+10 21.4	-0.1429	0.5268	0.2163	+32	-46
ξ^1 Ceti	4½	+2.79	+14.2	+ 8 19.7	22 12.0	+11 9.0	-0.2607	0.5268	+0.2158	+25	-53
ξ Arietis	5½	2.83	13.8	10 6.6	6 4 6.8	- 7 7.0	-0.9107	0.5271	0.2111	-11	-80
B. A. C. 755	6½	2.83	13.7	10 4.0	5 5.4	- 6 10.1	-0.6585	0.5271	0.2103	+ 4	-78
B. A. C. 830	6	2.86	13.1	10 16.2	12 57.4	+ 1 27.5	+0.7521	0.5283	0.2034	+90	+ 5
38 Arietis	5	2.89	13.1	11 58.9	14 9.6	+ 2 37.5	-0.8490	0.5283	0.2023	- 7	-78
B. A. C. 1272	6	+3.00	+ 8.2	+17 2.7	8 6 51.8	- 5 56.4	+0.9326	0.5378	+0.1513	+90	+22
Neptune				19 13.0	9 46.0	- 3 7.8	-1.0070	0.5391	0.1468	-20	-71
ε Tauri	3½	3.03	6.7	18 56.1	16 43.7	+ 3 36.6	+0.2811	0.5395	0.1354	+56	-13
W. iv, 650	6	3.03	6.0	20 27.7	21 18.5	+ 8 2.6	-0.7898	0.5405	0.1280	- 6	-70
ι Tauri	5	3.01	4.2	21 25.9	9 9 3.5	- 4 35.2	-0.4744	0.5426	0.1068	+13	-53
l Tauri	5½	+2.98	+ 3.9	+20 16.3	11 18.9	- 2 24.2	+1.0370	0.5437	+0.1029	+90	+35
105 Tauri	6	3.01	3.8	21 33.6	11 20.2	- 2 23.0	-0.3798	0.5437	0.1029	+18	-46
108 Tauri	6½	3.00	3.2	22 9.6	14 52.5	+ 1 2.4	-0.6863	0.5439	0.0962	0	-66
n Tauri	5½	2.99	2.9	21 59.0	16 40.1	+ 2 46.5	-0.3254	0.5451	0.0932	+21	-38
o Tauri	6	2.98	2.2	21 50.4	20 35.7	+ 6 34.4	+0.1839	0.5453	0.0856	+51	-13
B. A. C. 1801	6	+2.97	+ 1.0	+23 9.1	10 3 54.4	-10 21.4	-0.6944	0.5464	+0.0713	0	-65
141 Tauri	6½	2.90	- 0.3	22 23.9	12 29.0	- 2 3.8	+0.6759	0.5464	0.0540	+90	+17
1 Geminorum	5	2.90	0.5	23 16.2	13 35.6	- 0 59.4	-0.2266	0.5464	0.0519	+27	-32
2 Geminorum	7	2.90	0.8	23 38.9	14 50.1	+ 0 12.7	-0.5849	0.5475	0.0493	+ 6	-56
3 Geminorum	6½	2.88	0.9	23 7.8	16 12.5	+ 1 32.3	+0.0554	0.5475	0.0467	+43	-16
6 Geminorum	6½	+2.87	- 1.1	+22 55.9	17 24.9	+ 2 42.3	+0.3285	0.5476	+0.0438	+60	- 2
η Geminorum	3½	2.85	1.2	22 32.3	18 37.0	+ 3 52.0	+0.8156	0.5474	0.0416	+90	+26
9 Geminorum	6½	2.87	1.5	23 46.7	19 33.6	+ 4 46.8	-0.5166	0.5474	0.0396	+10	-49
μ Geminorum	3	2.84	1.7	22 34.2	22 22.0	+ 7 29.6	+0.9226	0.5470	+0.0345	+90	+33
ω Geminorum	5½	2.70	4.7	24 22.2	11 16 39.3	+ 1 10.6	-0.7930	0.5465	-0.0037	- 7	-66
44 Geminorum	6	+2.66	- 4.5	+22 48.1	18 2.5	+ 2 31.0	+0.9410	0.5465	-0.0063	+90	+37
48 Geminorum	6	2.66	5.3	24 18.8	21 19.5	+ 5 41.5	-0.7654	0.5463	0.0129	- 5	-66
58 Geminorum	6½	2.58	5.7	23 9.3	12 2 29.6	+10 41.3	+0.4197	0.5458	0.0240	+68	+ 6
82 Geminorum	6½	2.43	7.1	23 24.7	14 13.9	- 1 57.6	-0.2828	0.5442	0.0473	+23	-35
84 Geminorum	6½	2.40	7.2	22 37.0	16 20.4	+ 0 4.7	+0.4927	0.5432	0.0513	+73	+ 7
7 Cancri	6½	+2.34	- 7.6	+22 22.8	21 26.7	+ 5 1.0	+0.4669	0.5420	-0.0619	+71	+ 5
μ^1 Cancri	6½	2.33	7.9	22 57.0	22 35.6	+ 6 4.7	-0.2325	0.5420	0.0638	+26	-34
μ^2 Cancri	5½	2.31	7.6	21 54.1	23 18.3	+ 6 49.0	+0.8802	0.5420	0.0648	+90	+28
η Cancri	5½	2.16	8.7	20 48.9	13 11 9.7	- 5 42.7	+1.1730	0.5392	0.0875	+90	+49
γ Cancri	4½	2.10	9.3	21 51.9	16 11.9	- 0 50.3	-0.4531	0.5384	0.0969	+14	-54
B. A. C. 3206	6½	+1.84	-10.4	+20 15.8	14 12 15.1	- 5 25.4	-0.9817	0.5337	-0.1315	-19	-70
η Leonis	3½	+1.54	-10.5	+17 18.0	15 9 12.2	- 9 7.7	-0.8273	0.5206	-0.1633	- 7	-73

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
42 Leonis	6	+1.45	-10.0	+15 31.9	**15** 16 25.6	- 2 7.7	-0.1141	0.5280	-0.1734	+33	-39
i Leonis	5½	1.39	9.9	14 42.1	21 35.6	+ 2 52.7	-0.1246	0.5267	0.1795	+32	-40
ω Virginis	6	1.01	8.5	8 44.8	**17** 6 49.7	+11 5.9	-0.3156	0.5255	0.2144	+22	-56
ξ Virginis	5½	0.97	8.5	8 52.4	10 14.6	- 9 35.6	-1.1860	0.5261	0.2172	-31	-81
μ Virginis	4	0.97	8.0	7 9.0	10 32.3	- 9 18.4	+0.5822	0.5264	0.2176	+78	- 8
π Virginis	5	+0.89	- 8.0	+ 7 13.8	18 2.4	- 2 2.1	-1.1530	0.5273	-0.2226	-28	-83
c Virginis	5½	0.81	6.9	3 55.8	**18** 3 44.2	+ 7 21.9	+0.1384	0.5298	0.2289	+47	-31
B. A. C. 4254	6	0.74	6.3	+ 2 27.9	12 36.4	- 8 2.5	-0.3687	0.5313	0.2318	+20	-61
80 Virginis	6	0.56	3.9	- 4 49.9	**19** 16 3.6	- 5 27.8	+0.7399	0.5436	0.2345	+83	0
88 Virginis	6½	0.52	3.5	6 17.1	22 1.3	+ 0 18.1	+0.8312	0.5474	0.2330	+84	+ 6
94 Virginis	6½	+0.49	- 2.9	- 8 21.8	**20** 6 16.8	+ 8 17.1	+1.0350	0.5521	-0.2297	+82	+19
				NEW	*MOON.*						
58 Ophiuchi	5½	0.57	+ 1.1	21 37.7	**23** 22 43.5	- 2 38.1	-0.9226	0.6105	0.0800	-30	-90
4 Sagittarii	5½	0.62	1.1	23 48.3	**24** 4 46.0	+ 3 9.1	+0.7939	0.6130	0.0635	+66	+ 7
7 Sagittarii	6	+0.63	+ 1.1	-24 16.8	5 53.5	+ 4 13.8	+1.1940	0.6134	-0.0602	+66	+42
P. xvii, 330	5½	0.62	1.3	23 8.4	6 12.2	+ 4 31.7	+0.0478	0.6134	0.0595	+22	-37
P. xvii, 334	5½	0.62	1.3	22 50.3	6 19.2	+ 4 38.4	-0.2569	0.6134	0.0592	+ 7	-55
B. A. C. 6161	5½	0.64	1.3	23 43.4	9 11.3	+ 7 23.3	+0.4612	0.6137	0.0508	+46	-13
24 Sagittarii	6	0.69	1.5	24 6.8	17 22.6	- 8 46.3	+0.5271	0.6134	0.0276	+49	-10
25 Sagittarii	6½	+0.70	+ 1.5	-24 18.4	17 37.1	- 8 32.4	+0.7115	0.6134	-0.0263	+64	+ 2
B. A. C. 6343	6½	0.71	1.7	23 35.9	19 5.7	- 7 7.6	-0.0247	0.6134	0.0221	+15	-41
26 Sagittarii	6½	0.72	1.7	23 56.2	20 19.3	- 5 57.1	+0.2833	0.6131	0.0188	+32	-23
28 Sagittarii	5½	0.73	1.8	22 30.4	22 0.4	- 4 20.3	-1.1561	0.6130	0.0138	-54	-90
Jupiter				23 14.1	22 58.5	- 3 24.7	-0.4487	0.6046	0.0109	- 9	-69
ν^1 Sagittarii	5	+0.75	+ 2.1	-22 52.8	**25** 0 53.6	- 1 34.4	-0.8151	0.6130	-0.0053	-30	-90
ν^2 Sagittarii	5	0.75	2.1	22 48.6	1 14.7	- 1 14.1	-0.8859	0.6130	0.0043	-34	-90
B. A. C 6448	6½	0.76	2.0	23 18.9	1 34.1	- 0 55.6	-0.3877	0.6130	-0.0035	- 6	-65
χ^1 Sagittarii	5½	0.89	2.3	24 43.4	12 24.9	+ 9 27.8	+1.1420	0.6095	+0.0281	+65	+35
χ^2 Sagittarii	6½	0.89	2.4	24 37.7	12 27.3	+ 9 30.1	+1.0500	0.6095	0.0281	+65	+26
53 Sagittarii	6½	+0.93	+ 2.8	-23 40.7	17 53.1	- 9 17.8	+0.3018	0.6085	+0.0434	+35	-22
B. A. C. 6727	6	0.94	2.8	23 40.9	17 59.8	- 9 11.3	+0.3101	0 6082	0.0438	+36	-22
4 Capricorni	6	1.11	4.0	22 9.0	**26** 8 26.4	+ 4 39.6	-0.3028	0.5998	0.0822	+ 6	-58
17 Capricorni	6	1.22	4.6	21 54.9	19 25.6	- 8 47.6	+0.5183	0.5926	0.1095	+56	- 9
η Capricorni	5	1.29	5.3	20 17.5	**27** 2 43.6	- 1 46.8	-0.2551	0.5871	0.1253	+12	-55
27 Capricorni	6½	+1.32	+ 5.2	-21 0.0	4 47.2	+ 0 12.0	+0.7226	0.5862	+0.1301	+69	+ 1
φ Capricorni	5½	1.34	5.2	21 6.7	7 15.6	+ 2 34.8	+1.1650	0.5831	0.1353	+69	+35
κ Capricorni	5	1.46	6.5	19 22.2	18 27.3	-10 38.9	+1.0510	0.5749	0.1574	+71	+23
29 Aquarii *mult.*	6½	1.55	7.4	17 29.8	**28** 2 53.3	- 2 31.5	+0.5331	0.5676	0.1715	+62	-10
56 Aquarii	6½	1.67	8.6	15 9.0	15 6.0	+ 9 15.3	+0.3452	0.5586	0.1892	+53	-21
τ^2 Aquarii	4	+1.79	+ 9.0	-14 10.6	23 48.2	- 6 20.4	+1.0410	0.5514	+0.1993	+76	+21
74 Aquarii	6	1.79	9.7	12 12.3	**29** 1 35.2	- 4 37.2	-0.6340	0.5507	0.2016	+ 2	-84
ψ^1 Aquarii	4	1.91	10.8	9 41.3	11 57.6	+ 5 24.5	-1.0930	0.5436	0.2115	-26	-90
ψ^2 Aquarii	4	1.92	10.7	9 47.2	12 55.5	+ 6 20.6	-0.7857	0.5428	0.2123	- 7	-90
ψ^3 Aquarii	4½	1.93	10.6	10 12.9	13 25.2	+ 6 49.3	-0.2383	0.5425	0.2125	+23	-53
B. A. C. 8274	7	+2.07	+11.9	- 6 59.6	**30** 3 33.8	- 3 29.4	-0.5130	0.5345	+0.2219	+11	-72
30 Piscium	4½	2.13	12.0	6 37.7	10 6.2	+ 2 50.6	+0.5670	0.5316	0.2251	+74	-10
33 Piscium	4½	2.15	12.1	6 19.5	11 45.9	+ 4 27.2	+0.6258	0.5316	0.2258	+79	- 6
B. A. C. 17	6	+2.17	+12.2	- 5 51.6	14 13.0	+ 6 49.8	+0.6921	0.5301	+0.2266	+84	- 3
DECEMBER.											
15 Ceti	6½	+2.32	+13.4	- 1 6.7	**1** 4 2.7	- 3 46.1	-1.1500	0.5253	+0.2295	-28	-90
20 Ceti	5	2.38	13.1	- 1 44.7	11 34.8	+ 3 32.4	+1.2510	0.5234	0.2298	+88	+37
26 Ceti	6	2.46	13.6	+ 0 46.5	17 2.8	+ 8 50.5	-0.1663	0.5224	0.2292	+31	-49
29 Ceti	6½	+2.48	+13.7	+ 1 24.9	19 9.9	+10 53.7	-0.3617	0.5224	+0.2292	+20	-61
33 Ceti	6	+2.50	+13.8	+ 1 51.5	20 28.7	-11 49.8	-0.5337	0.5217	+0.2288	+11	-73

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
35 Ceti	6½	+2.50	+13.7	+ 1 53.3	**1** 21 28.9	-10 51.4	-0.3352	0.5217	+0.2284	+22	-59
f Piscium	5	2.53	14.1	3 2.0	**2** 0 10.0	- 8 15.2	-0.9430	0.5217	0.2281	-12	-87
ν Piscium	4½	2.65	13.9	4 55.8	12 14.0	+ 3 27.2	-0.2425	0.5205	0.2237	+26	-53
64 Ceti	5½	2.80	13.5	8 3.2	**3** 3 31.1	- 5 43.0	-0.2352	0.5214	0.2154	+27	-52
ξ^1 Ceti	4½	2.81	13.5	8 19.7	4 20.9	- 4 54.6	-0.3536	0.5216	0.2151	+21	-58
ξ Arietis	5½	+2.88	+13.4	+10 6.6	10 21.0	+ 0 54.7	-0.9979	0.5218	+0.2106	-17	-80
B. A. C. 755	6½	2.89	13.3	10 4.0	11 20.4	+ 1 52.3	-0.7427	0.5218	0.2099	- 1	-78
B. A. C. 830	6	2.94	12.7	10 16.2	19 19.6	+ 9 37.1	+0.6858	0.5237	0.2032	+89	+ 1
38 Arietis	5	2.98	12.9	11 58.9	20 32.7	+10 48.0	-0.9204	0.5237	0.2022	-12	-78
Lalande 5725	6	3.08	11.8	12 45.9	**4** 7 20.8	- 2 43.4	+0.3550	0.5264	0.1913	+61	-16
NEPTUNE				+19 4.4	**5** 15 6.3	+ 4 2.9	-1.0820	0.5369	+0.1501	-26	-71
ε Tauri	3½	+3.42	+ 6.9	18 56.1	23 39.4	-11 40.1	+0.2931	0.5382	0.1367	+57	-13
ι Tauri	5	3.49	4.3	21 25.9	**6** 16 3.7	+ 4 12.5	-0.4449	0.5429	0.1079	+15	-51
l Tauri	5½	3.47	3.9	20 16.3	18 19.4	+ 6 23.9	+1.0740	0.5430	0.1042	+90	+38
n Tauri	5½	3.51	+ 2.9	21 58.9	23 41.4	+11 35.3	-0.2817	0.5448	0.0943	+24	-39
1 Geminorum	5	+3.52	- 0.8	+23 16.2	**7** 20 37.4	+ 7 50.1	-0.1643	0.5476	+0.0532	+30	-29
η Geminorum	3½	3.51	1.6	22 32.3	**8** 1 38.5	-11 18.9	+0.8892	0.5488	0.0431	+90	+30
μ Geminorum	3	3.52	2.3	22 34.2	5 23.1	- 7 41.7	+0.9962	0.5488	+0.0353	+90	+38
ω Geminorum	5½	3.46	5.6	24 22.2	23 38.5	+ 9 57.3	-0.7037	0.5486	-0.0024	- 1	-63
44 Geminorum	6	3.41	5.7	22 48.1	**9** 1 1.2	+11 17.3	+1.0340	0.5483	0.0055	+90	+44
48 Geminorum	6	+3.43	- 6.4	+24 18.8	4 18.0	- 9 32.4	-0.6759	0.5478	-0.0122	+ 1	-61
μ^2 Cancri	5½	3.18	10.3	21 54.0	**10** 6 15.1	- 8 26.6	+0.9963	0.5436	0.0648	+90	+35
γ Cancri	4½	3.00	12.5	21 51.9	23 10.3	+ 7 55.7	-0.3328	0.5386	0.0965	+21	-43
B. A. C. 3206	6½	2.76	14.4	20 15.8	**11** 19 20.0	+ 3 27.0	-0.8582	0.5320	0.1308	-10	-70
η Leonis	3½	2.48	15.3	17 17.9	**12** 16 31.0	- 0 1.2	-0.6960	0.5255	0.1622	+ 1	-72
42 Leonis	6	+2.38	-15.2	+15 31.8	23 51.1	+ 7 5.5	+0.0201	0.5242	-0.1719	+41	-32
i Leonis	5½	2.31	15.2	14 42.0	**13** 5 6.2	-11 49.0	+0.0110	0.5229	0.1783	+40	-33
ι Leonis *mult.*	4	1.97	14.9	11 8.1	**14** 7 35.2	-10 7.4	-1.2070	0.5184	0.2056	-34	-79
ω Virginis	6	1.88	14.3	8 44.7	15 4.9	- 2 51.1	-0.1885	0.5182	0.2118	+29	-49
ξ Virginis	5½	1.84	14.4	8 52.3	18 35.3	+ 0 33.0	-1.0700	0.5183	0.2142	-22	-81
ν Virginis	4	+1.84	-13.8	+ 7 8.9	18 53.5	+ 0 50.7	+0.7186	0.5184	-0.2146	+90	+ 1
π Virginis	5	1.76	13.9	7 13.7	**15** 2 36.2	+ 8 19.6	-1.0410	0.5188	0.2195	-19	-83
11 Virginis	6	1.71	13.7	6 25.3	7 19.3	-11 5.7	-1.2190	0.5200	0.2224	-34	-84
c Virginis	5½	1.65	12.7	3 55.7	12 35.1	- 5 59.4	+0.2624	0.5206	0.2251	+55	-25
B. A. C. 4254	6	1.55	12.0	+ 2 27.8	21 43.6	+ 2 52.6	-0.2592	0.5230	0.2282	+26	-54
80 Virginis	6	+1.31	- 9.0	- 4 50.0	**17** 2 0.7	+ 6 17.4	+0.8425	0.5347	-0.2316	+85	+ 6
88 Virginis	6½	1.26	8.3	6 17.1	8 8.7	-11 46.4	+0.9241	0.5356	0.2299	+84	+11
94 Virginis	6½	1.20	7.3	8 21.8	16 37.7	- 3 33.9	+1.1210	0.5436	0.2269	+82	+26
ξ^1 Libræ	6	1.04	5.5	11 26.8	**18** 14 27.4	- 6 28.7	-0.5379	0.5602	0.2110	- 8	-74
o^1 Libræ	6½	0.99	3.9	15 8.9	**19** 1 56.7	+ 4 36.2	+0.8393	0.5709	0.1979	+75	+ 7
o^2 Libræ	6½	+0.98	- 3.9	-14 44.4	2 48.3	+ 5 25.9	+0.2592	0.5709	-0.1967	+48	-25
ζ^3 Libræ	6	0.97	3.5	16 13.7	6 0.7	+ 8 31.2	+1.1270	0.5738	0.1923	+74	+29
ζ^4 Libræ	5½	0.96	3.3	16 28.7	6 57.2	+ 9 25.7	+1.1970	0.5753	0.1908	+74	+36
γ Libræ	4½	0.95	3.3	14 25.2	8 4.4	+10 30.4	-1.0760	0.5764	0.1893	-29	-90
η Libræ	6	0.93	3.2	15 19.2	11 37.0	-10 4.9	-0.8354	0.5788	0.1841	-13	-90
θ Libræ	4½	+0.91	- 2.8	-16 24.2	15 36.1	- 6 14.9	-0.4750	0.5821	-0.1777	+ 7	-70
49 Libræ	6	0.90	2.8	16 12.3	18 17.1	- 3 40.0	-1.1410	0.5845	0.1730	-37	-90
ν^2 Scorpii	4½	0.89	2.1	19 10.3	22 54.0	+ 0 46.1	+1.0290	0.5892	0.1644	+71	+21
φ Ophiuchi	4½	0.88	- 1.6	19 46.7	**20** 3 41.7	+ 5 22.6	+0.8630	0.5928	0.1548	+70	+10
VENUS				22 12.0	19 28.2	- 3 29.1	+1.0790	0.5550	-0.1121	+68	+27
				NEW	*MOON.*						
JUPITER				-22 41.2	**22** 19 8.0	- 5 52.0	-0.9788	0.6121	+0.0165	-39	-90
4 Capricorni	6	+1.00	+ 3.7	22 9.0	**23** 17 57.5	- 8 1.3	-0.3442	0.6137	0.0836	+ 4	-61
17 Capricorni	6	1.05	4.2	21 54.9	**24** 4 32.6	+ 2 7.3	+0.4596	0.6057	0.1112	+51	-14
η Capricorni	5	+1.09	+ 4.8	-20 17.5	11 34.3	+ 8 51.8	-0.3052	0.5995	+0.1282	+10	-58
27 Capricorni	6½	+1.11	+ 4.8	-21 0.0	13 33.1	+10 45.8	+0.6549	0.5974	+0.1328	+66	- 3

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1889.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
φ Capricorni	5½	+1.13	+ 4.8	-21 6.7	24 15 55.8	-10 57.2	+1.0890	0.5960	+0.1380	+69	+27
ε Capricorni	4½	1.21	5.3	19 57.7	25 0 27.5	- 2 45.7	+1.2060	0.5882	0.1559	+70	+39
κ Capricorni	5	1.23	5.5	19 22.2	2 42.3	- 0 36.1	+0.9716	0.5864	0.1600	+71	+17
29 Aquarii *mult.*	6½	1.29	6.2	17 29.8	10 49.5	+ 7 12.4	+0.4650	0.5784	0.1745	+58	-14
56 Aquarii	6½	1.40	7.0	15 9.0	22 36.0	- 5 27.0	+0.2756	0.5689	0.1927	+48	-25
τ^1 Aquarii *mult.*	5½	+1.49	+ 7.3	-14 38.4	26 6 10.5	+ 1 51.3	+1.2610	0.5614	+0.2020	+75	+42
τ^2 Aquarii	4	1.50	7.4	14 10.7	7 0.5	+ 2 39.4	+0.9779	0.5611	0.2032	+76	+16
74 Aquarii	6	1.52	8.0	12 12.4	8 44.1	+ 4 19.5	-0.6858	0.5594	0.2047	- 2	-90
ψ^1 Aquarii	4	1.62	8.9	9 41.4	18 47.3	- 9 58.2	-1.1410	0.5513	0.2144	-31	-90
ψ^2 Aquarii	4	1.62	9.0	9 47.3	19 43.6	- 9 3.7	-0.8366	0.5508	0.2152	- 9	-90
ψ^3 Aquarii	4½	+1.63	+ 8.8	-10 13.0	20 12.3	- 8 36.0	-0.2964	0.5508	+0.2158	+21	-57
B. A. C. 8274	7	1.77	9.9	6 59.6	27 9 58.5	+ 4 42.8	-0.5722	0.5411	0.2249	+ 8	-77
30 Piscium	4½	1.84	10.0	6 37.7	16 21.8	+10 53.6	+0.4982	0.5374	0 2274	+69	-13
33 Piscium	4½	1.86	10.1	6 19.5	17 59.3	-11 32.0	+0.5543	0.5364	0.2284	+73	-10
B. A. C. 17	6	1.88	10.3	5 51.6	20 23.3	- 9 12.5	+0.6210	0.5354	0.2291	+79	- 7
15 Ceti	6½	+2.05	+11.5	- 1 6.7	28 9 58.4	+ 3 57.1	-1.2000	0.5286	+0.2314	-31	-90
20 Ceti	5	2.12	11.1	- 1 44.7	17 24.3	+11 9.3	+1.1820	0.5253	0.2309	+88	+30
26 Ceti	6	2.20	11.7	+ 0 46.5	22 48.6	- 7 36.3	-0.2214	0.5238	0.2302	+28	-52
29 Ceti	6½	2.23	11.9	1 24.9	29 0 54.5	- 5 34.3	-0.4137	0.5237	0.2299	+18	-64
33 Ceti	6	2.24	12.0	1 51.5	2 12.5	- 4 18.6	-0.5845	0.5228	0.2295	+ 9	-78
35 Ceti	6½	+2.25	+12.0	+ 1 53.3	3 12.2	- 3 20.7	-0.3880	0.5228	+0.2295	+19	-62
f Piscium	5	2.28	12.2	3 2.0	5 51.8	- 0 46.0	-0.9893	0.5219	0.2286	-13	-87
ν Piscium	4½	2.44	12.2	4 55.8	17 51.8	+10 52.4	-0.2913	0.5206	0.2242	+24	-56
64 Ceti	5½	2.63	12.2	8 3.2	30 9 7.7	+ 1 41.1	-0.2772	0.5192	0.2150	+25	-53
ξ^1 Ceti	4½	2.63	12.2	8 19.7	9 57.5	+ 2 29.4	-0.3960	0.5200	0.2148	+19	-61
ξ Arietis	5½	+2.72	+12.3	+10 6.6	15 58.2	+ 8 19.3	-1.0380	0.5200	+0.2100	-20	-80
B. A. C. 755	6½	2.73	12.2	10 4.0	16 57.9	+ 9 17.2	-0.7839	0.5206	0.2095	- 3	-64
B. A. C. 830	6	2.82	11.4	10 16.2	31 0 58.6	- 6 56.5	+0.6466	0.5206	0.2023	+85	- 2
38 Arietis	5	2.85	11.8	11 58.9	2 12.2	- 5 45.1	-0.9565	0.5217	0.2016	-14	-78
Lalande 5725	6	+3.00	+10.9	+12 45.9	13 3.8	+ 4 46.9	+0.3206	0.5232	+0.1904	+59	-18

OCCULTATIONS VISIBLE AT WASHINGTON DURING THE YEAR 1889.

Date.	THE STAR'S		IMMERSION.				EMERSION.				Duration of Occultation.
			Washington.		Angle from		Washington.		Angle from		
	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.	Vertex.	
			h m	h m	°	°	h m	h m	°	°	h m
	NEW MOON.										
Feb. 8	δ^1 Tauri ‡	4	10 28	13 20	42	351	11 21	14 3	304	255	0 43
8	δ^3 Tauri ‡	5½	11 3	13 45	76	26	11 57	14 39	271	224	0 54
11	*d* Geminorum	6	8 36	11 7	69	20	9 49	12 20	303	247	1 13
14	83 Cancri	5½	2 18	4 38	6	56	Star 0′.7	north of	☽'s	limb.	
14	8 Leonis	5½	12 35	14 53	73	20	13 28	15 46	333	278	0 52
15	37 Leonis	5½	4 37	6 52	131	184	5 34	7 49	256	310	0 56
23	58 Ophiuchi	5½	13 18	15 1	90	134	14 18	16 0	302	339	1 0
	NEW MOON.										
Mar. 8	B. A. C. 1468	6½	7 40	8 32	125	72	8 37	9 30	219	164	0 57
8	*i* Tauri	5½	10 37	11 28	130	77	11 19	12 10	221	171	0 42
11	63 Geminor. *mult.*	5½	12 10	12 50	89	32	13 7	13 47	293	240	0 57
18	80 Virginis	6	12 51	13 3	157	176	13 55	14 7	268	269	1 4
23	JUPITER		18 42	18 34	46	43	19 44	19 35	314	298	1 1
	NEW MOON.										
Apr. 4	δ^3 Tauri	5	7 15	6 21	121	68	8 14	7 20	219	164	0 58
	NEW MOON.										
May 6	35 Cancri	6½	15 34	12 33	175	126	15 51	12 50	213	165	0 17
7	83 Cancri	5½	11 56	8 52	186	139	12 19	9 15	220	170	0 23
8	37 Leonis	5½	15 39	12 30	137	84	16 30	13 21	268	216	0 52
	NEW MOON.										
30	ζ Tauri	3½	11 45	7 10	97	44	12 40	8 6	263	215	0 56
31	μ Geminorum	3	9 1	4 23	16	320	9 20	4 42	350	293	0 19
June 1	δ Geminor. *mult.*	3½	12 2	7 20	132	75	12 56	8 13	250	195	0 54
13	JUPITER		22 31	16 59	356	312	♃ 0′.2	north of	☽'s	limb.	
17	56 Aquarii	6½	19 27	13 40	49	12	20 40	14 53	269	244	1 13
19	B. A. C. 17 †	6	18 26	12 31	80	131	19 19	13 24	281	330	0 53
	NEW MOON.										
July 6	88 Virginis	6½	17 3	10 2	190	153	17 23	10 22	204	164	0 20
23	ζ Tauri	3½	0 46	16 36	74	130	1 57	17 47	251	307	1 11
25	δ Geminor. *mult.*	3½	0 54	16 36	119	172	1 43	17 26	228	283	0 49
26	MERCURY		11 42	3 23	60	3	12 38	4 19	329	274	0 56
	NEW MOON.										
Aug. 2	80 Virginis ‡	6	18 39	9 52	119	68	19 37	10 50	284	233	0 58
4	o^2 Libræ ‡	6½	20 21	11 25	84	35	21 16	12 20	304	254	0 55
18	δ^1 Tauri	4	21 28	11 37	132	183	21 55	12 4	189	241	0 27
18	δ^3 Tauri	5	22 33	12 42	82	135	23 35	13 43	234	289	1 2

NOTE. The angles of position are counted from the north point and vertex of the moon's limb, toward the east.
* Whole occultation below the horizon of Washington.
† Immersion below the horizon of Washington.
‡ Emersion below the horizon of Washington.

OCCULTATIONS VISIBLE AT WASHINGTON DURING THE YEAR 1889.

Date.	The Star's		Immersion.				Emersion.				Duration of Occultation.
			Washington.		Angle from		Washington.		Angle from		
	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.	Vertex.	
			h m	h m	°	°	h m	h m	°	°	h m
	NEW MOON.										
Sept. 3	Jupiter		20 36	9 43	135	103	21 25	10 31	224	184	0 49
3	P. xvii, 330 ‡	5½	22 0	11 6	66	22	22 58	12 4	289	241	0 58
9	30 Piscium	4½	0 59	13 41	133	105	1 48	14 30	161	130	0 49
14	B. A. C. 1272	6	0 16	12 38	54	108	1 31	13 53	254	303	1 15
	NEW MOON.										
Oct. 1	26 Sagittarii	6½	19 27	6 43	42	31	20 24	7 40	314	292	0 56
3	17 Capricorni	6	20 1	7 10	93	100	21 19	8 27	234	223	1 18
14	η Geminorum †	3½	22 41	9 6	54	100	23 30	9 55	284	335	0 49
14	μ Geminorum	3	3 1	13 25	168	224	Star 1′.2	south of	☽'s	limb.	
16	7 Cancri	6½	2 0	12 16	358	51	Star 0′.0	north of	☽'s	limb.	
16	μ^2 Cancri	5½	3 59	14 15	176	233	4 4	14 20	184	241	0 5
	NEW MOON.										
29	χ^3 Sagittarii	5½	19 20	4 47	61	61	20 36	6 3	286	269	1 16
Nov. 1	56 Aquarii	6½	0 52	10 6	57	26	2 1	11 15	244	203	1 9
3	33 Piscium	4½	19 40	4 46	34	81	20 41	5 47	274	310	1 1
3	B. A. C. 17	6	22 45	7 51	77	93	0 1	9 7	215	211	1 17
8	ε Tauri	3½	8 51	17 36	70	15	9 55	18 40	273	229	1 4
10	141 Tauri	6½	2 20	10 58	135	192	2 59	11 36	194	249	0 39
10	3 Geminorum	6½	8 2	16 40	32	341	8 47	17 24	329	273	0 45
10	6 Geminorum	6½	9 24	18 1	86	29	10 39	19 16	281	224	1 15
12	84 Geminorum	6½	7 30	15 59	150	169	8 29	16 59	228	209	1 0
	NEW MOON.										
24	4 Sagittarii ‡	5½	21 40	5 24	92	51	22 41	6 25	266	222	1 1
27	27 Capricorni	6½	20 51	4 23	44	50	22 4	5 36	276	265	1 13
30	30 Piscium	4½	3 28	10 47	100	55	4 19	11 38	202	154	0 50
Dec. 14	ν Virginis	4	12 30	18 53	137	123	13 50	20 12	291	256	1 20
	NEW MOON.										

NOTE.—The angles of position are counted from the north point and vertex of the moon's limb, toward the east.
* Whole occultation below the horizon of Washington.
† Immersion below the horizon of Washington.
‡ Emersion below the horizon of Washington.

DOWNES'S TABLE GIVING VALUES OF τ.

FOR COMPUTING THE TIME AND HOUR-ANGLE OF APPARENT CONJUNCTION.

h		Lat. 72°			Lat. 66°			Lat. 60°			Lat. 54°			Lat. 48°			Lat. 42°			Lat. 36°		
		x'			*x'*			*x'*			*x'*			*x'*			*x'*			*x'*		
		.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50
h	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	10	2	2	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	6	5	6	7
	20	3	3	4	4	5	5	5	6	7	6	7	9	8	9	11	9	10	12	11	12	14
	30	5	5	6	6	7	8	8	9	11	10	11	13	12	13	16	14	16	18	16	18	22
	40	6	7	8	8	9	11	11	12	14	13	15	17	16	18	21	18	21	24	21	24	29
	50	7	8	10	10	11	13	13	15	17	16	19	21	19	22	26	22	26	30	26	30	36
1	0	9	10	11	12	14	16	16	18	21	19	22	26	23	26	31	26	31	36	30	35	42
	10	10	12	13	14	16	18	18	21	24	22	26	30	26	30	36	31	35	42	35	40	48
	20	12	13	15	16	18	21	21	23	27	25	29	34	30	34	40	35	40	47	39	45	54
	30	13	15	17	18	20	23	23	26	30	28	32	37	33	38	45	39	44	52	43	50	59
	40	14	16	18	20	22	25	25	29	33	31	35	41	36	42	49	42	48	57	47	54	64
	50	16	18	20	21	24	28	27	31	36	34	38	44	39	45	53	45	52	61	51	58	68
2	0	17	19	22	23	26	30	29	33	39	36	41	47	42	48	56	48	55	65	54	62	72
	10	18	20	23	25	28	32	31	36	41	38	43	50	45	51	59	51	59	68	57	66	76
	20	19	22	24	26	30	34	33	38	43	40	46	53	47	54	62	54	62	71	60	69	80
	30	20	23	26	28	31	36	35	40	45	42	48	55	50	56	65	57	64	74	63	72	83
	40	21	24	27	29	33	37	37	42	47	44	50	58	52	59	68	59	67	77	65	74	86
	50	22	25	28	30	34	39	38	43	49	46	52	60	54	61	70	61	69	79	68	76	88
3	0	23	26	30	31	35	40	40	45	51	48	54	62	56	63	72	63	71	81	70	79	90
	10	24	27	31	33	36	42	41	46	53	49	56	63	57	65	74	65	73	83	72	81	92
	20	25	28	32	34	38	43	42	47	54	51	57	65	59	66	75	66	74	85	73	82	93
	30	26	29	33	35	39	44	43	49	55	52	58	66	60	67	77	68	76	86	74	83	95
	40	26	29	33	36	40	45	44	50	56	53	59	67	61	69	78	69	77	87	75	84	96
	50	27	30	34	36	41	46	45	51	57	54	60	68	62	70	79	70	78	88	76	85	96
4	0	28	31	35	37	41	47	46	52	58	55	61	69	63	70	79	71	79	89	77	86	97
	10	28	31	35	38	42	47	47	52	59	56	62	70	64	71	80	71	79	89	78	86	97
	20	29	32	36	38	42	48	47	53	59	56	62	70	64	71	80	72	80	89	78	87	97
	30	29	32	36	39	43	48	48	53	60	57	63	71	65	72	81	72	80	90	79	87	97
	40	29	33	37	39	43	49	48	53	60	57	63	71	65	72	81	72	80	89	79	87	97
	50	30	33	37	39	44	49	48	54	60	57	63	71	65	72	81	72	80	89	79	87	96
5	0	30	33	37	39	44	49	49	54	60	57	63	71	65	72	80	72	80	89	78	86	95
	10	30	33	37	40	44	49	49	54	60	57	63	71	65	72	80	72	79	88	78	86	95
	20	30	33	37	40	44	49	49	54	60	57	63	71	65	71	79	72	79	88	78	85	94
	30	30	33	37	40	44	49	49	54	60	57	63	70	64	71	79	71	78	87	77	85	93
	40	30	33	37	39	44	49	48	53	59	56	62	70	64	70	78	70	77	86	76	84	91
	50	30	33	37	39	43	48	48	53	59	56	61	69	63	70	77	70	77	85	75	83	90
6	0	30	33	37	39	43	48	48	52	58	55	61	68	63	69	76	69	76	84	74	82	89
	10	30	33	37	39	43	47	47	52	58	55	60	67	62	68	75	68	75	82	73	80	87
	20	29	32	36	38	42	47	47	51	57	54	60	66	61	67	74	67	73	81	72	79	85
	30	29	32	36	38	42	46	46	51	56	53	59	65	60	66	73	66	72	80	71	78	84
	40	29	32	35	37	41	46	45	50	55	53	58	64	59	65	71	65	71	78	70	76	82
	50	28	31	35	37	40	45	45	49	54	52	57	62	58	63	70	63	69	76	68	74	80
7	0	28	31	34	36	40	44	44	48	53	51	55	61	57	62	68	62	68	75	67	73	78
	10	27	30	34	35	39	43	43	47	52	50	54	60	56	61	67	61	66	73	65	71	76
	20	27	30	33	35	38	42	42	46	51	48	53	58	54	59	65	59	65	71	64	69	74
	30	26	29	32	34	37	41	41	45	49	47	52	57	53	58	63	58	63	69	62	67	71
	40	26	28	31	33	36	40	40	44	48	46	50	55	51	56	62	56	61	67			
	50	25	27	31	32	35	39	39	42	47	45	49	53	50	54	60	54	59	65			
8	0	24	27	30	31	34	38	38	41	45	43	47	52	48	52	58	53	57	63			
	10	24	26	29	30	33	37	36	40	44	42	46	50	47	51	56	52	55	60			
	20	23	25	28	29	32	35	35	38	42	40	44	48	45	49	54						
	30	22	24	27	28	31	34	34	37	41	39	42	46	43	47	52						
	40	21	23	26	27	30	33	33	35	39	37	41	44	41	45	49						
	50	20	22	25	26	28	31	31	34	37	36	39	42	40	43	47						
9	0	19	21	24	25	27	30	30	32	35	34	37	40									
	10	18	20	22	24	26	28	28	31	34	32	35	38									
	20	18	19	21	22	24	27	27	29	32	31	33	36									
	30	16	18	20	21	23	25	25	27	30	29	31	34									
	40	15	17	19	20	22	24	24	26	28	27	29	32									

(Concluded at bottom of next page.)

DOWNES'S TABLE GIVING VALUES OF τ.

FOR COMPUTING THE TIME AND HOUR-ANGLE OF APPARENT CONJUNCTION.

h	Lat. 30°			Lat. 24°			Lat. 18°			Lat. 12°			Lat. 6°			Lat. 0°		
	x'			x'			x'			x'			x'			x'		
	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50
h m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	6	7	8	7	7	9	7	8	9	7	8	10	7	8	10	8	9	11
20	12	14	16	13	14	18	14	16	19	14	16	20	14	17	21	15	18	21
30	17	20	24	19	22	27	20	24	29	21	25	30	21	25	31	22	26	32
40	23	27	32	25	29	36	26	32	39	28	33	40	28	34	41	29	34	42
50	28	33	40	31	36	44	32	39	48	35	40	50	35	42	51	35	42	52
1 0	33	39	47	36	42	52	38	46	56	40	47	59	41	49	60	41	49	61
10	38	45	54	41	48	59	44	52	63	46	54	67	47	56	68	47	56	69
20	43	50	60	46	54	65	49	58	70	52	60	74	53	62	75	53	63	76
30	48	55	66	51	60	71	54	64	76	57	66	79	58	68	81	59	69	82
40	52	60	71	56	65	77	59	69	82	62	72	84	63	73	87	64	74	88
50	56	64	76	60	69	82	64	74	87	66	77	89	68	78	92	68	79	93
2 0	59	68	80	64	73	86	68	78	91	70	81	95	72	83	97	72	83	98
10	62	72	84	67	77	90	71	81	95	74	85	99	75	87	101	76	87	102
20	65	75	87	70	81	94	74	85	99	77	88	103	78	90	105	79	91	106
30	68	78	90	73	84	97	77	88	102	80	91	106	81	93	108	82	94	109
40	71	81	93	76	87	100	80	91	105	83	94	109	84	96	111	85	97	112
50	74	83	96	78	89	102	82	93	107	85	96	111	87	98	113	87	99	114
3 0	76	85	98	80	91	104	84	95	109	87	98	113	89	100	115	89	101	116
10	77	87	99	82	92	106	86	97	111	89	100	114	91	102	116	91	103	117
20	79	89	101	84	94	107	88	99	112	91	102	115	92	104	118	93	104	118
30	80	90	102	85	95	108	89	100	113	92	103	116	94	105	119	94	105	119
40	81	91	103	86	96	109	90	101	114	93	104	117	95	106	119	95	106	120
50	82	92	104	87	97	110	91	101	114	94	104	118	95	106	120	96	107	120
4 0	83	92	104	88	98	110	92	102	114	94	105	118	96	107	120	97	107	120
10	84	93	104	88	98	110	92	102	114	95	105	118	96	107	120	97	107	120
20	84	93	104	89	98	110	92	102	114	95	105	117	96	107	119	97	107	120
30	84	93	104	89	98	110	92	102	114	95	105	117	96	107	119	97	107	119
40	84	93	104	89	98	109	92	102	113	95	104	116	96	106	118	97	107	119
50	84	93	103	88	97	108	92	101	113	94	104	115	96	106	117	96	106	118
5 0	84	92	102	88	97	108	91	101	112	94	103	114	95	105	116	96	105	117
10	83	92	102	88	96	107	91	100	110	93	102	113	95	104	115	95	104	115
20	83	91	101	87	95	106	90	99	109	92	101	112	94	103	114	94	103	114
30	82	90	100	86	94	104	89	98	108	92	100	111	93	102	112	93	102	113
40	81	89	98	85	93	103	88	97	106	91	99	109	92	100	110			
50	80	88	97	84	92	101	87	95	105	89	97	107						
6 0	79	87	95	83	91	100	86	94	103	88	96	105						
10	78	85	94	82	89	98	84	92	101									
20	77	84	92	80	88	96	82	91	99									
30	75	82	90	79	86	94												
40	74	81	88	77	84	92												
50	72	79	86															
7 0	71	77	84															

(*Concluded from preceding page.*)

h	Lat. 72°			Lat. 66°			Lat. 60°			*h*	Lat. 72°			Lat. 66°			Lat. 60°		
	x'			x'			x'				x'			x'			x'		
	.62	.56	.50	.62	.56	.50	.62	.56	.50		.62	.56	.50	.62	.56	.50	.62	.56	.50
h m	m	m	m	m	m	m	m	m	m	h m	m	m	m	m	m	m	m	m	m
9 50	14	16	18	18	20	22	22	24	26	11 0	7	8	8	9	10	11	10	11	12
10 0	13	15	16	17	19	21	20	22	24	10	6	6	7	7	8	9	9	9	10
10	12	14	15	16	17	19	19	21	22	20	5	5	6	6	6	7	7	8	8
20	11	12	14	15	16	17	17	19	20	30	3	4	4	4	5	5			
30	10	11	12	13	14	16	16	17	18	40	2	3	3	3	3	4			
40	9	10	11	12	13	14	14	15	16	50	1	1	1	1	2	2			
50	8	9	10	10	11	12	12	13	14	12 0	0	0	0	0	0	0			

FOR WASHINGTON MEAN NOON.

Date.	*k*	*i*	*θ*	*L*	Date.	*k*	*i*	*θ*	*L*
Jan. 1	0.997	6°.6	33°.5	27.2	July 0	0.112	140°.8	161°.0	16.2
6	0.986	13.6	11.6	30.6	5	0.212	125.2	166.5	27.1
11	0.963	22.2	0.9	36.0	10	0.334	109.4	171.2	37.9
16	0.916	33.6	353.3	43.9	15	0.479	92.4	176.2	49.0
21	0.834	48.0	346.9	54.5	20	0.640	73.8	181.9	59.8
26	0.693	67.3	342.3	64.4	25	0.803	52.7	189.2	67.8
31	0.484	91.9	337.6	64.6	30	0.927	31.3	198.8	68.2
Feb. 5	0.244	120.1	332.0	44.5	Aug. 4	0.989	12.2	220.3	61.0
10	0.064	150.8	319.5	14.0	9	0.995	7.8	338.7	51.0
15	0.011	168.0	229.9	2.4	14	0.970	19.9	7.5	42.2
20	0.081	146.9	177.5	15.1	19	0.932	30.3	15.6	36.0
25	0.208	125.7	169.1	29.2	24	0.889	38.8	19.9	31.9
Mar. 2	0.336	109.2	165.0	35.1	29	0.845	46.3	22.7	29.6
7	0.449	96.4	161.8	35.8	Sept. 3	0.800	53.1	24.5	28.6
12	0.533	86.2	159.1	33.9	8	0.750	60.0	25.7	28.7
17	0.606	77.7	156.5	32.3	13	0.694	67.2	26.5	29.9
22	0.670	70.1	154.2	31.3	18	0.626	75.4	27.0	32.0
27	0.727	62.9	152.1	31.2	23	0.542	85.2	27.5	34.6
Apr. 1	0.782	55.7	150.5	32.3	28	0.434	97.6	28.3	36.6
6	0.837	47.6	149.3	34.8	Oct. 3	0.298	113.9	29.7	34.8
11	0.892	38.3	148.4	39.2	8	0.143	135.5	32.8	23.5
16	0.946	26.8	148.0	45.8	13	0.020	163.7	44.2	4.3
21	0.988	12.4	146.2	54.5	18	0.026	161.5	197.3	6.0
26	0.998	5.5	344.7	63.6	23	0.199	127.1	206.7	39.2
May 1	0.951	25.7	338.0	68.5	28	0.439	97.0	208.3	62.3
6	0.844	46.6	340.5	65.8	Nov. 2	0.650	72.5	208.4	62.4
11	0.704	65.9	344.2	57.6	7	0.797	53.6	207.4	52.6
16	0.564	82.6	347.9	48.5	12	0.886	39.4	205.6	42.5
21	0.436	97.4	351.6	40.3	17	0.940	28.4	202.8	35.0
26	0.323	110.7	355.0	33.2	22	0.970	19.8	198.5	29.9
31	0.222	123.8	358.3	25.9	27	0.988	12.5	192.1	26.7
June 5	0.133	137.2	2.1	17.8	Dec. 2	0.997	6.3	178.4	24.9
10	0.060	151.6	8.4	8.7	7	0.999	2.6	102.6	24.3
15	0.015	165.9	28.1	2.5	12	0.997	6.4	32.5	24.8
20	0.007	170.3	113.7	1.2	17	0.988	12.6	18.1	26.5
25	0.042	156.4	151.2	6.7	22	0.971	19.7	9.8	29.5
30	0.112	140.8	161.0	16.2	27	0.941	28.2	3.3	34.4
					32	0.889	39.0	357.4	41.7

NOTATION.

k, the ratio of the illuminated portion of the apparent disk to the entire apparent disk considered as the superficies of a circle.

i, the angle between the sun and earth, as seen from the planet.

θ, the angle which the line joining the cusps, or extremities of the illuminated portion, makes with the meridian.

L, the brilliancy of the disk. The unit of *L* is the amount of light received by an eye from a circular disk with the same albedo as the planet, subtending an angular radius of one second of arc, situated at distance unity from the sun, and illuminated by the latter as the mean disk of the planet is illuminated.

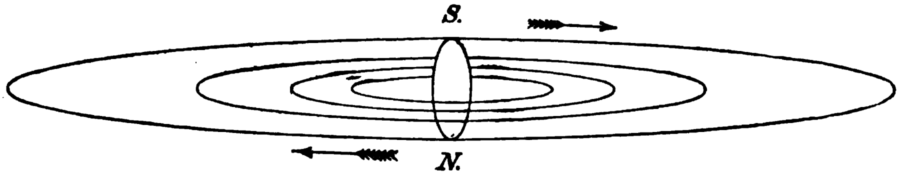
FOR WASHINGTON MEAN NOON.

Date.	*k*	*i*	*θ*	*L*	Date.	*k*	*i*	*θ*	*L*
Jan. 1	0.713	64°.8	342°.5	91.7	June 5	0.260	118°.7	158°.3	185.5
6	0.697	66.9	341.1	95.5	10	0.302	113.3	158.6	183.5
11	0.679	69.0	339.9	99.9	15	0.341	108.5	159.1	177.7
16	0.661	71.2	338.8	104.8	20	0.377	104.1	160.0	170.2
21	0.642	73.5	337.9	110.0	25	0.411	100.2	161.1	161.8
26	0.622	75.9	337.1	115.6	30	0.443	96.5	162.5	153.1
31	0.600	78.4	336.5	121.8	July 5	0.473	93.1	164.0	144.5
Feb. 5	0.578	81.0	336.1	128.5	10	0.501	89.9	165.8	136.5
10	0.554	83.7	335.9	135.7	15	0.528	86.8	167.7	129.0
15	0.530	86.6	335.8	143.5	20	0.553	83.9	169.7	122.1
20	0.503	89.6	335.7	151.8	25	0.578	81.1	172.0	115.8
25	0.475	92.8	335.8	160.6	30	0.600	78.5	174.4	110.1
Mar. 2	0.445	96.3	336.0	169.5	Aug. 4	0.622	75.9	176.9	104.8
7	0.413	100.1	336.1	178.6	9	0.643	73.4	179.4	100.0
12	0.378	104:1	336.2	187.3	14	0.663	70.9	182.0	95.6
17	0.341	108.5	336.2	194.8	19	0.683	68.5	184.7	91.7
22	0.302	113.4	336.0	199.3	24	0.702	66.2	187.3	88.1
27	0.259	118.8	335.6	199.5	29	0.720	63.9	189.8	84.8
Apr. 1	0.214	125.0	334.7	192.7	Sept. 3	0.737	61.7	192.3	81.7
6	0.167	131.8	333.2	175.8	8	0.754	59.5	194.6	78.9
11	0.120	139.5	330.8	147.0	13	0.770	57.3	196.7	76.3
13	0.101	143.0	329.4	131.1	18	0.786	55.1	198.8	74.0
15	0.084	146.5	327.7	114.1	23	0.801	53.0	200.6	71.8
17	0.067	150.1	325.7	95.7	28	0.815	50.9	202.1	69.8
19	0.051	153.8	323.2	77.0	Oct. 3	0.829	48.8	203.5	67.9
21	0.037	157.7	319.8	58.2	8	0.842	46.8	204.6	66.2
23	0.026	161.7	315.0	41.0	13	0.855	44.8	205.5	64.5
25	0.016	165.6	308.1	26.1	18	0.867	42.8	206.1	63.1
27	0.009	169.3	296.5	14.6	23	0.879	40.8	206.4	61.6
29	0.005	172.1	275.2	7.7	28	0.889	38.8	206.4	60.3
May 1	0.004	173.0	240.6	6.1	Nov. 2	0.900	36.9	206.2	59.1
3	0.005	171.4	208.2	9.3	7	0.910	35.0	205.6	57.9
5	0.010	168.3	188.7	16.9	12	0.919	33.1	204.7	56.8
7	0.018	164.7	178.8	28.8	17	0.927	31.2	203.5	55.8
9	0.028	160.8	172.6	43.8	22	0.935	29.4	202.1	54.8
11	0.040	156.9	168.6	60.6	27	0.943	27.6	200.3	53.9
13	0.054	153.0	165.9	78.5	Dec. 2	0.950	25.8	198.3	53.1
15	0.070	149.2	163.8	96.7	7	0.956	24.0	196.0	52.3
17	0.087	145.7	162.4	113.7	12	0.962	22.3	193.4	51.6
19	0.105	142.3	161.3	129.0	17	0.968	20.6	190.5	50.9
21	0.123	138.9	160.3	142.5	22	0.973	18.9	187.3	50.3
26	0.170	131.3	159.0	167.5	27	0.978	17.2	183.9	49.7
31	0.216	124.7	158.4	180.8	32	0.982	15.6	180.2	49.2
June 5	0.260	118.7	158.3	185.5					

The planet Mars not being in opposition during the year 1889, the satellites will not be visible.

APPARENT DISK OF MARS.

January	1,	0.939
January	31,	0.958
March	2,	0.973
April	1,	0.986
May	1,	0.995
May	31,	0.999
June	30,	1.000
July	30,	0.995
August	29,	0.987
September	28,	0.973
October	28,	0.956
November	27,	0.936
December	27,	0.917



APPARENT ORBITS OF THE SATELLITES OF JUPITER IN 1889, *AS SEEN IN AN INVERTING TELESCOPE.*

(*The vertical scale is three times the horizontal one.*)

The object of this figure is to facilitate the identification of the satellites in cases where the diagrams of configurations do not suffice for that purpose: reference to the above diagram enables one to identify the inner and outer satellite of the pair. The central, vertical ellipse represents the disk of Jupiter, elongated two and one-half times in the vertical direction to correspond to the representation of the orbits of the satellites.

Facing each page of the phenomena of Jupiter's satellites, pages 452—475, is the page of diagrams of configurations, for the same month. The light disks ○ in the vertical row in the middle of the page represent the relative position of Jupiter each day. The dots adjacent in the same horizontal space represent the positions of the several satellites on the same day, at the hour and minute of Washington mean time indicated above the diagrams. The latitudes of the satellites are always considered zero in constructing the diagrams, except where two or more satellites chance to be at nearly the same distance from the planet, when they are placed one above the other according to their apparent latitudes. The numerals designating the satellites are placed on the right or left hand side of the dot, according as the motion of the satellite, for the time of the configuration, is toward the east or toward the west—the motion being always toward the numeral. Frequently, at the epoch of the configuration, one or more satellites will be invisible, being projected on the disk of the planet: this phenomenon is indicated by a light disk ○ at the left hand side of the page. Frequently, also, one or more satellites will be invisible, being concealed in occultation behind the disk, or eclipsed in the shadow of the planet: this phenomenon is indicated by a dark disk ● at the right hand side of the page. In both cases, the annexed numeral serves to point out which satellite is thus rendered invisible.

When an observation is made at a different hour from that for which the diagram is constructed, the motion of the satellite during the interval may be judged by transferring its given position to the above diagram, and estimating its motion during the elapsed interval on the above diagram of the orbits, by means of the following table of the periods:—

MEAN SYNODIC PERIODS OF THE SATELLITES.

	d	h	m	s		d
I.	1	18	28	35.945	=	1.76986048
II.	3	13	17	53.735	=	3.55409416
III.	7	3	59	35.854	=	7.16638720
IV.	16	18	5	6.928	=	16.75355241

WASHINGTON MEAN TIMES OF SUPERIOR GEOCENTRIC CONJUNCTION.

SATELLITE I.

		h m			h m			h m			h m
Jan.	1	11 14.4	March	30	23 49.6	June	27	10 11.9	Sept.	22	2 24.9
	3	5 44.8	April	1	18 17.9		29	4 37.9		23	20 53.8
	5	0 15.1		3	12 46.2		30	23 3.9		25	15 22.7
	6	18 45.2		5	7 14.3	July	2	17 29.8		27	9 51.6
	8	13 15.6		7	1 42.5		4	11 55.9		29	4 20.7
	10	7 45.7		8	20 10.5		6	6 21.9		30	22 49.7
	12	2 16.0		10	14 38.5		8	0 48.1	Oct.	2	17 18.8
	13	20 46.1		12	9 6.3		9	19 14.2		4	11 47.9
	15	15 16.3		14	3 34.2		11	13 40.4		6	6 17.1
	17	9 46.4		15	22 1.9		13	8 6.6		8	0 46.4
	19	4 16.5		17	16 29.6		15	2 33.0		9	19 15.7
	20	22 46.6		19	10 57.2		16	20 59.2		11	13 45.1
	22	17 16.6		21	5 24.8		18	15 25.5		13	8 14.5
	24	11 46.7		22	23 52.3		20	9 51.8		15	2 44.0
	26	6 16.6		24	18 19.8		22	4 18.3		16	21 13.5
	28	0 46.5		26	12 47.1		23	22 44.7		18	15 43.1
	29	19 16.5		28	7 14.5		25	17 11.2		20	10 12.7
	31	13 46.3		30	1 41.7		27	11 37.8		22	4 42.4
Feb.	2	8 16.2	May	1	20 8.9		29	6 4.6		23	23 12.1
	4	2 46.0		3	14 35.9		31	0 31.2		25	17 41.8
	5	21 15.8		5	9 3.0	Aug.	1	18 58.1		27	12 11.5
	7	15 45.6		7	3 29.9		3	13 24.8		29	6 41.3
	9	10 15.4		8	21 56.8		5	7 51.8		31	1 11.2
	11	4 44.9		10	16 23.6		7	2 18.8	Nov.	1	19 41.0
	12	23 14.6		12	10 50.5		8	20 45.9		3	14 10.9
	14	17 44.3		14	5 17.2		10	15 13.0		5	8 40.8
	16	12 13.9		15	23 43.9		12	9 40.3		7	3 10.8
	18	6 43.4		17	18 10.4		14	4 7.5		8	21 40.8
	20	1 13.0		19	12 37.1		15	22 34.9		10	16 10.8
	21	19 42.5		21	7 3.5		17	17 2.3		12	10 40.9
	23	14 11.9		23	1 30.0		19	11 29.8		14	5 11.1
	25	8 41.1		24	19 56.2		21	5 57.3		15	23 41.0
	27	3 10.5		26	14 22.7		23	0 24.9		17	18 11.1
	28	21 39.8		28	8 48.9		24	18 52.6		19	12 41.3
March	2	16 9.1		30	3 15.2		26	13 20.4		21	7 11.5
	4	10 38.3		31	21 41.4		28	7 48.2		23	1 41.6
	6	5 7.4	June	2	16 7.7		30	2 16.0		24	20 11.9
	7	23 36.4		4	10 33.7		31	20 44.0		26	14 42.2
	9	18 5.5		6	4 59.9	Sept.	2	15 12.1		28	9 12.4
	11	12 34.4		7	23 26.0		4	9 40.2		30	3 42.7
	13	7 3.4		9	17 52.1		6	4 8.4	Dec.	1	22 13.0
	15	1 32.3		11	12 18.1		7	22 36.6		3	16 43.4
	16	20 1.2		13	6 44.2		9	17 5.0		5	11 13.7
	18	14 29.9		15	1 10.2		11	11 33.3		7	5 44.1
	20	8 58.5		16	19 36.2		13	6 1.8		9	0 14.4
	22	3 27.3		18	14 2.1		15	0 30.2		10	18 44.7
	23	21 56.0		20	8 28.1		16	18 58.8		12	13 15.2
	25	16 24.4		22	2 54.0		18	13 27.4		14	7 45.6
	27	10 52.9		23	21 20.0		20	7 56.2		16	2 16.0
	29	5 21.3		25	15 46.0						

WASHINGTON MEAN TIMES OF SUPERIOR GEOCENTRIC CONJUNCTION.

SATELLITE II.

		h m			h m			h m			h m
Jan.	2	1 24.4	March	31	23 6.7	June	28	16 26.0	Sept.	25	10 41.5
	5	14 48.7	April	4	12 22.7	July	2	5 33.3		29	0 0.8
	9	4 12.8		8	1 38.0		5	18 40.8	Oct.	2	13 21.6
	12	17 36.6		11	14 52.8		9	7 48.6		6	2 41.8
	16	7 0.2		15	4 7.1		12	20 56.4		9	16 3.6
	19	20 23.7		18	17 21.0		16	10 4.8		13	5 24.7
	23	9 46.9		22	6 34.3		19	23 13.3		16	18 47.3
	26	23 9.9		25	19 47.1		23	12 22.6		20	8 9.2
	30	12 32.7		29	8 59.4		27	1 31.9		23	21 32.6
Feb.	3	1 55.1	May	2	22 11.1		30	14 42.2		27	10 55.4
	6	15 17.2		6	11 22.3	Aug.	3	3 52.5		31	0 19.3
	10	4 39.1		10	0 32.9		6	17 3.9	Nov.	3	13 42.5
	13	18 0.6		13	13 43.1		10	6 15.1		7	3 7.3
	17	7 21.9		17	2 52.9		13	19 27.7		10	16 31.1
	20	20 42.8		20	16 2.2		17	8 40.1		14	5 56.4
	24	10 3.3		24	5 11.1		20	21 53.9		17	19 20.7
	27	23 23.5		27	18 19.7		24	11 7.6		21	8 46.3
March	3	12 43.4		31	7 27.8		28	0 22.6		24	22 11.1
	7	2 2.8	June	3	20 35.7		31	13 37.4		28	11 37.1
	10	15 21.8		7	9 43.2	Sept.	4	2 53.8	Dec.	2	1 2.1
	14	4 40.4		10	22 50.7		7	16 9.9		5	14 28.3
	17	17 58.6		14	11 57.8		11	5 27.4		9	3 53.5
	21	7 16.3		18	1 5.0		14	18 44.6		12	17 19.9
	24	20 33.5		21	14 11.9		18	8 3.4		16	6 45.4
	28	9 50.4		25	3 19.2		21	21 21.7			

SATELLITE III.

		h m			h m			h m			h m
Jan.	5	0 31.9	April	8	7 26.0	July	3	1 10.1	Sept.	26	20 46.5
	12	4 58.1		15	11 15.5		10	4 28.5	Oct.	4	0 52.2
	19	9 23.3		22	15 0.3		17	7 48.4		11	5 1.4
	26	13 47.6		29	18 40.6		24	11 11.1		18	9 14.3
Feb.	2	18 10.0	May	6	22 16.4		31	14 37.3		25	13 29.6
	9	22 30.7		14	1 48.7	Aug.	7	18 7.5	Nov.	1	17 47.5
	17	2 48.5		21	5 16.8		14	21 42.8		8	22 7.6
	24	7 3.8		28	8 40.7		22	1 22.1		16	2 30.2
March	3	11 15.9	June	4	12 1.4		29	5 6.6		23	6 55.4
	10	15 25.0		11	15 19.6	Sept.	5	8 55.0		30	11 21.8
	17	19 31.1		18	18 36.4		12	12 47.9	Dec.	7	15 49.8
	24	23 33.3		25	21 53.2		19	16 45.1		14	20 18.2
April	1	3 32.1									

SATELLITE IV.

		h m			h m			h m			h m
Jan.	12	21 47.0	April	23	15 2.7	July	15	17 26.0	Oct.	7	4 51.9
	29	18 5.7	May	10	7 7.2	Aug.	1	8 21.0		24	0 4.6
Feb.	15	14 0.9		26	22 18.3		18	0 4.9	Nov.	9	19 54.0
March	4	9 24.6	June	12	12 50.3	Sept.	3	16 45.5		26	16 10.0
	21	4 7.8		29	3 3.9		20	10 23.1	Dec.	13	12 45.4
April	6	22 2.5									

WASHINGTON MEAN TIME.

JANUARY.

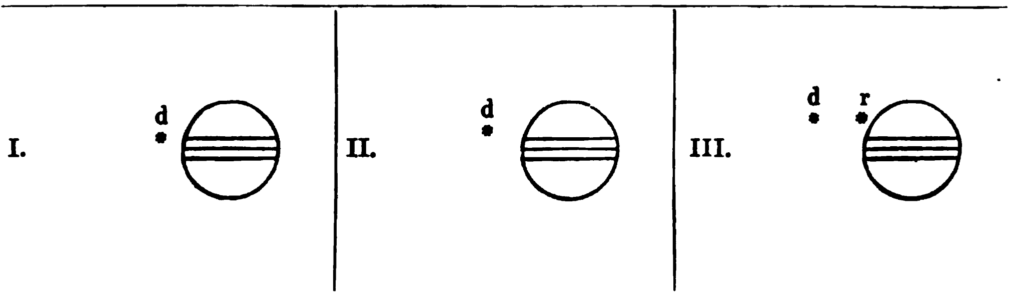
d	h	m	s				d	h	m	s				d	h	m	s			
1	7	20		III.	Sh.	In.	11	5	39		I.	Sh.	Eg.	21	18	15		I. *	Sh.	In.
	8	58		III.	Tr.	In.		6	13		I.	Tr.	Eg.		18	59		I.	Tr.	In.
	9	44	44.1	I.	Ec.	Dis.	12	0	35	39.3	I.	Ec.	Dis.		20	30		I.	Sh.	Eg.
	9	46		III.	Sh.	Eg.		1	27	3.2	III.	Ec.	Dis.		21	14		I.	Tr.	Eg.
	11	30		III.	Tr.	Eg.		3	23		I.	Oc.	Re.	22	15	26	27.8	I.	Ec.	Dis.
	12	22		I.	Oc.	Re.		6	15		III.	Oc.	Re.		18	24		I.	Oc.	Re.
	23	19	47.2	II.	Ec.	Dis.		15	11	26.6	II.	Ec.	Dis.		19	14		III.	Sh.	In.
2	2	42		II.	Oc.	Re.		18	54		II.	Oc.	Re.		21	43		III.	Sh.	Eg.
	7	2		I.	Sh.	In.		21	53		I.	Sh.	In.		22	13		III.	Tr.	In.
	7	28		I.	Tr.	In.		22	29		I.	Tr.	In.	23	0	50		III.	Tr.	Eg.
	9	17		I.	Sh.	Eg.	13	0	8		I.	Sh.	Eg.		7	2	36.6	II.	Ec.	Dis.
	9	43		I.	Tr.	Eg.		0	44		I.	Tr.	Eg.		11	5		II.	Oc.	Re.
3	4	13	11.7	I.	Ec.	Dis.		19	4	4.2	I.	Ec.	Dis.		12	43		I.	Sh.	In.
	6	52		I.	Oc.	Re.		21	54		I.	Oc.	Re.		13	29		I.	Tr.	In.
	17	27		II.	Sh.	In.	14	9	21		II.	Sh.	In.		14	58		I.	Sh.	Eg.
	18	20		II.	Tr.	In.		10	35		II.	Tr.	In.		15	44		I.	Tr.	Eg.
	20	1		II.	Sh.	Eg.		11	55		II.	Sh.	Eg.	24	9	54	52.9	I.	Ec.	Dis.
	20	56		II.	Tr.	Eg.		13	11		II.	Tr.	Eg.		12	54		I.	Oc.	Re.
4	1	30		I.	Sh.	In.		16	21		I.	Sh.	In.	25	1	15		II.	Sh.	In.
	1	58		I.	Tr.	In.		16	59		I.	Tr.	In.		2	47		II.	Tr.	In.
	3	45		I.	Sh.	Eg.		18	36		I.	Sh.	Eg.		3	49		II.	Sh.	Eg.
	4	13		I.	Tr.	Eg.		19	14		I.	Tr.	Eg.		5	23		II.	Tr.	Eg.
	21	29	20.4	III.	Ec.	Dis.	15	13	32	36.0	I.	Ec.	Dis.		7	11		I.	Sh.	In.
	22	41	43.1	I.	Ec.	Dis.		15	17		III.	Sh.	In.		7	59		I.	Tr.	In.
5	1	23		I.	Oc.	Re.		16	24		I.	Oc.	Re.		9	26		I.	Sh.	Eg.
	1	48		III.	Oc.	Re.		17	45		III.	Sh.	Eg.		10	14		I.	Tr.	Eg.
	12	37	5.0	II.	Ec.	Dis.		17	49		III.	Tr.	In.	26	4	23	22.7	I.	Ec.	Dis.
	16	6		II.	Oc.	Re.		20	24		III.	Tr.	Eg.		7	24		I.	Oc.	Re.
	19	59		I.	Sh.	In.	16	4	28	34.4	II.	Ec.	Dis.		9	22	56.8	III.	Ec.	Dis.
	20	28		I.	Tr.	In.		8	18		II.	Oc.	Re.		11	42	4.8	III.	Ec.	Re.
	22	14		I.	Sh.	Eg.		10	50		I.	Sh.	In.		12	29		III.	Oc.	Dis.
	22	43		I.	Tr.	Eg.		11	29		I.	Tr.	In.		15	6		III.	Oc.	Re.
6	17	10	9.0	I.	Ec.	Dis.		13	5		I.	Sh.	Eg.		20	19	33.1	II.	Ec.	Dis.
	19	53		I.	Oc.	Re.		13	44		I.	Tr.	Eg.	27	0	28		II.	Oc.	Re.
7	6	45		II.	Sh.	In.	17	8	1	1.9	I.	Ec.	Dis.		1	40		I.	Sh.	In.
	7	45		II.	Tr.	In.		10	54		I.	Oc.	Re.		2	29		I.	Tr.	In.
	9	19		II.	Sh.	Eg.		22	39		II.	Sh.	In.		3	55		I.	Sh.	Eg.
	10	21		II.	Tr.	Eg.		23	59		II.	Tr.	In.		4	44		I.	Tr.	Eg.
	14	27		I.	Sh.	In.	18	1	13		II.	Sh.	Eg.		22	51	46.0	I.	Ec.	Dis.
	14	58		I.	Tr.	In.		2	35		II.	Tr.	Eg.	28	1	54		I.	Oc.	Re.
	16	42		I.	Sh.	Eg.		5	18		I.	Sh.	In.		14	33		II.	Sh.	In.
	17	13		I.	Tr.	Eg.		5	59		I.	Tr.	In.		16	11		II.	Tr.	In.
8	11	18		III.	Sh.	In.		7	33		I.	Sh.	Eg.		17	7		II.	Sh.	Eg.
	11	38	41.5	I.	Ec.	Dis.		8	14		I.	Tr.	Eg.		18	47		II.	Tr.	Eg.
	13	23		III.	Tr.	In.	19	2	29	32.3	I.	Ec.	Dis.		20	8		I.	Sh.	In.
	13	45		III.	Sh.	Eg.		5	24		I.	Oc.	Re.		20	59		I.	Tr.	In.
	14	23		I.	Oc.	Re.		5	24	46.3	III.	Ec.	Dis.		22	23		I.	Sh.	Eg.
	15	57		III.	Tr.	Eg.		7	42	39.7	III.	Ec.	Re.		23	14		I.	Tr.	Eg.
9	1	54	20.4	II.	Ec.	Dis.		8	5		III.	Oc.	Dis.	29	17	20	16.8	I.	Ec.	Dis.
	5	30		II.	Oc.	Re.		10	41		III.	Oc.	Re.		20	24		I.	Oc.	Re.
	8	56		I.	Sh.	In.		17	45	35.9	II.	Ec.	Dis.		23	12		III.	Sh.	In.
	9	28		I.	Tr.	In.		21	42		II.	Oc.	Re.	30	1	42		III.	Sh.	Eg.
	11	10		I.	Sh.	Eg.		23	46		I.	Sh.	In.		2	35		III.	Tr.	In.
	11	43		I.	Tr.	Eg.	20	0	29		I.	Tr.	In.		5	13		III.	Tr.	Eg.
10	6	7	8.4	I.	Ec.	Dis.		2	1		I.	Sh.	Eg.		9	36	27.4	II.	Ec.	Dis.
	8	53		I.	Oc.	Re.		2	44		I.	Tr.	Eg.		13	51		II.	Oc.	Re.
	20	3		II.	Sh.	In.		20	57	56.4	I.	Ec.	Dis.		14	36		I.	Sh.	In.
	21	10		II.	Tr.	In.		23	54		I.	Oc.	Re.		15	29		I.	Tr.	In.
	22	37		II.	Sh.	Eg.	21	11	57		II.	Sh.	In.		16	51		I.	Sh.	Eg.
	23	46		II.	Tr.	Eg.		13	23		II.	Tr.	In.		17	44		I. *	Tr.	Eg.
11	3	24		I.	Sh.	In.		14	31		II.	Sh.	Eg.	31	11	48	41.4	I.	Ec.	Dis.
	3	58		I.	Tr.	In.		15	59		II.	Tr.	Eg.		14	54		I.	Oc.	Re.

NOTE.—In. denotes ingress: Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc., denotes occultation; Tr , transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

JANUARY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 18h for an Inverting Telescope.

Day.	West.		East.
1	·3 2·	O	·1 4·
2	3· 1·	O	·2 4·
3	·3 2	O	· 1· 4·
4	·2 ·1 ·3 4·	O	
5	4·	O	·2 1· ·3
6	4·	O	2· ·3 ·1 ●
7	4· 2· 1·	O	3·
8	·4 ·2 3·	O	·1
9	·4 3· 1·	O	·2
10	·4 ·3	O	2· ·1
11	·4 2· ·3 ·1	O	
12	·	O	4 1· ·3 ·2 ●
13	·1	O	·4 2· ·3
14	O 1· 2·	O	3· ·4
15	O 3· ·2	O	·1 ·4
16	3· 1·	O	·2 ·4
17	·3	O	2· ·1 4·
18	2· ·3 ·1	O	4·
19		O	·3 1· 4· ·2 ●
20	·1	O	4· 2· ·3
21	4· 2·	O	1· 3·
22	4· ·2	O	3· ·1 ●
23	4· 3· 1·	O	·2
24	4· 3·	O	·1 2·
25	·4 ·3 2· 1·	O	
26	·4 ·2	O	·3 1·
27	·4 ·1	O	·2 ·3
28	O 2· ·4	O	1· 3·
29	·2 ·	·4 O	3· ·1 ●
30	3· 1·	O	·2 ·4
31	3·	O	·1 2· ·4

WASHINGTON MEAN TIME.

FEBRUARY.

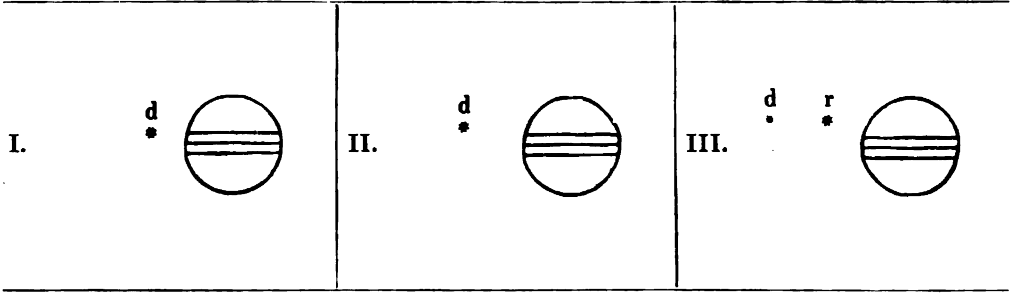
d	h	m	s				d	h	m	s				d	h	m	s			
1	3	51		II.	Sh.	In.	10	5	26		I.	Sh.	In.	19	23	1	29.9	I.	Ec.	Dis.
	5	35		II.	Tr.	In.		5	57		II.	Oc.	Re.	20	2	21		I.	Oc.	Re.
	6	25		II.	Sh.	Eg.		6	27		I.	Tr.	In.		11	4		III.	Sh.	In.
	8	11		II.	Tr.	Eg.		7	41		I.	Sh.	Eg.		13	38		III.	Sh.	Eg.
	9	5		I.	Sh.	In.		8	43		I.	Tr.	Eg.		15	28		III.	Tr.	In.
	9	59		I.	Tr.	In.	11	2	39	18.0	I.	Ec.	Dis.		17	17	4.0	II.*	Ec.	Dis.
	11	20		I.	Sh.	Eg.		5	53		I.	Oc.	Re.		18	11		III.	Tr.	Eg.
	12	14		I.	Tr.	Eg.		19	45		II.	Sh.	In.		20	17		I.	Sh.	In.
2	6	17	10.7	I.	Ec.	Dis.		21	45		II.	Tr.	In.		21	23		I.	Tr.	In.
	9	24		I.	Oc.	Re.		22	19		II.	Sh.	Eg.		22	1		II.	Oc.	Re.
	13	20	53.5	III.	Ec.	Dis.		23	54		I.	Sh.	In.		22	32		I.	Sh.	Eg.
	15	41	16.7	III.	Ec.	Re.	12	0	21		II.	Tr.	Eg.		23	39		I.	Tr.	Eg.
	16	50		III.	Oc.	Dis.		0	56		I.	Tr.	In.	21	17	29	53.0	I.*	Ec.	Dis.
	19	29		III.	Oc.	Re.		2	10		I.	Sh.	Eg.		20	50		I.	Oc.	Re.
	22	53	18.9	II.	Ec.	Dis.		3	12		I.	Tr.	Eg.	22	11	39		II.	Sh.	In.
3	3	13		II.	Oc.	Re.		21	7	47.6	I.	Ec.	Dis.		13	51		II.	Tr.	In.
	3	33		I.	Sh.	In.	13	0	22		I.	Oc.	Re.		14	15		II.	Sh.	Eg.
	4	28		I.	Tr.	In.		7	6		III.	Sh.	In.		14	45		I.	Sh.	In.
	5	48		I.	Sh.	Eg.		9	39		III.	Sh.	Eg.		15	52		I.	Tr.	In.
	6	43		I.	Tr.	Eg.		11	12		III.	Tr.	In.		16	27		II.*	Tr.	Eg.
4	0	45	33.3	I.	Ec.	Dis.		13	54		III.	Tr.	Eg.		17	0		I.*	Sh.	Eg.
	3	54		I.	Oc.	Re.		14	43	40.0	II.	Ec.	Dis.		18	8		I.	Tr.	Eg.
	17	9		II.*	Sh.	In.		18	23		I.	Sh.	In.	23	11	58	21.0	I.	Ec.	Dis.
	18	59		II.	Tr.	In.		19	19		II.	Oc.	Re.		15	20		I.	Oc.	Re.
	19	43		II.	Sh.	Eg.		19	25		I.	Tr.	In.	24	1	14	41.9	III.	Ec.	Dis.
	21	35		II.	Tr.	Eg.		20	38		I.	Sh.	Eg.		3	38	49.7	III.	Ec.	Re.
	22	1		I.	Sh.	In.		21	41		I.	Tr.	Eg.		5	42		III.	Oc.	Dis.
	22	58		I.	Tr.	In.	14	15	36	11.2	I.	Ec.	Dis.		6	33	44.7	II.	Ec.	Dis.
5	0	16		I.	Sh.	Eg.		18	52		I.	Oc.	Re.		8	25		III.	Oc.	Re.
	1	13		I.	Tr.	Eg.	15	9	3		II.	Sh.	In.		9	13		I.	Sh.	In.
	19	14	3.2	I.	Ec.	Dis.		11	7		II.	Tr.	In.		10	21		I.	Tr.	In.
	22	24		I.	Oc.	Re.		11	38		II.	Sh.	Eg.		11	22		II.	Oc.	Re.
6	3	9		III.	Sh.	In.		12	51		I.	Sh.	In.		11	28		I.	Sh.	Eg.
	5	41		III.	Sh.	Eg.		13	43		II.	Tr.	Eg.		12	37		I.	Tr.	Eg.
	6	55		III.	Tr.	In.		13	55		I.	Tr.	In.	25	6	26	42.0	I.	Ec.	Dis.
	9	34		III.	Tr.	Eg.		15	7		I.	Sh.	Eg.		9	49		I.	Oc.	Re.
	12	10	7.9	II.	Ec.	Dis.		16	11		I.	Tr.	Eg.	26	0	57		II.	Sh.	In.
	16	30		I.	Sh.	In.	16	10	4	39.6	I.	Ec.	Dis.		3	13		II.	Tr.	In.
	16	35		II.	Oc.	Re.		13	22		I.	Oc.	Re.		3	33		II.	Sh.	Eg.
	17	28		I.*	Tr.	In.		21	17	3.9	III.	Ec.	Dis.		3	41		I.	Sh.	In.
	18	45		I.	Sh.	Eg.		23	39	56.5	III.	Ec.	Re.		4	50		I.	Tr.	In.
	19	43		I.	Tr.	Eg.	17	1	28		III.	Oc.	Dis.		5	49		II.	Tr.	Eg.
7	13	42	27.3	I.	Ec.	Dis.		4	0	23.7	II.	Ec.	Dis.		5	56		I.	Sh.	Eg.
	16	53		I.	Oc.	Re.		4	9		III.	Oc.	Re.		7	6		I.	Tr.	Eg.
8	6	27		II.	Sh.	In.		7	19		I.	Sh.	In.	27	0	55	10.5	I.	Ec.	Dis.
	8	22		II.	Tr.	In.		8	24		I.	Tr.	In.		4	18		I.	Oc.	Re.
	9	1		II.	Sh.	Eg.		8	40		II.	Oc.	Re.		15	2		III.	Sh.	In.
	10	58		II.	Tr.	Eg.		9	35		I.	Sh.	Eg.		17	37		III.*	Sh.	Eg.
	10	58		I.	Sh.	In.		10	40		I.	Tr.	Eg.		19	41		III.	Tr.	In.
	11	57		I.	Tr.	In.	18	4	33	0.9	I.	Ec.	Dis.		19	50	21.8	II.	Ec.	Dis.
	13	13		I.	Sh.	Eg.		7	51		I.	Oc.	Re.		22	9		I.	Sh.	In.
	14	13		I.	Tr.	Eg.		22	21		II.	Sh.	In.		22	25		III.	Tr.	Eg.
9	8	10	56.2	I.	Ec.	Dis.	19	0	29		II.	Tr.	In.		23	19		I.	Tr.	In.
	11	23		I.	Oc.	Re.		0	57		II.	Sh.	Eg.	28	0	24		I.	Sh.	Eg.
	17	19	13.8	III.*	Ec.	Dis.		1	48		I.	Sh.	In.		0	42		II.	Oc.	Re.
	19	40	56.6	III.	Ec.	Re.		2	54		I.	Tr.	In.		1	35		I.	Tr.	Eg.
	21	10		III.	Oc.	Dis.		3	5		II.	Tr.	Eg.		19	23	33.2	I.	Ec.	Dis.
	23	51		III.	Oc.	Re.		4	4		I.	Sh.	Eg.		22	48		I.	Oc.	Re.
10	1	26	56.8	II.	Ec.	Dis.		5	10		I.	Tr.	Eg.							

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

FEBRUARY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 17ʰ for an Inverting Telescope.

Day.	West.		East.
1	·3 2· 1·	O	.4
2	·2	O	·1 ·4 ·3 ●
3	·1	O	·2 ·3 4·
4		O	2· 1· 3· 4·
5	2· ·1	O	3· 4·
6	3· 1	O	·2 4·
7	3· 4·	O	·1 2·
8	4· ·3 2· 1·	O	
9	4· ·2 ·3	O	·1
10	4· 1·	O	·2 ·3
11	·4	O	2· 1· ·3
12	·4 2· ·1	O	3.
13	·4 3·	O	1· ·2 ●
14	3· ·4	O	2· ·1 ●
15	·3 2· 1·	O	·4
16	·2 ·3	O	·1 ·4
17	1·	O	·2 ·3 ·4
18		O	2· ·1 ·3 ·4
19	2· ·1	O	3· ·4
20	O 3· ·2	O	1· 4·
21	3· ·	O	1 ·2 4·
22	O 1· ·3 2·	O	4·
23	·2 ·3	O	4· ·1
24	4· 1·	O	·2 ·3
25	4·	O	.1 2· ·3
26	4· 2· ·1	O	3·
27	4· ·2	O	3· 1·
28	·4 3· ·1	O	·2

WASHINGTON MEAN TIME.

MARCH.

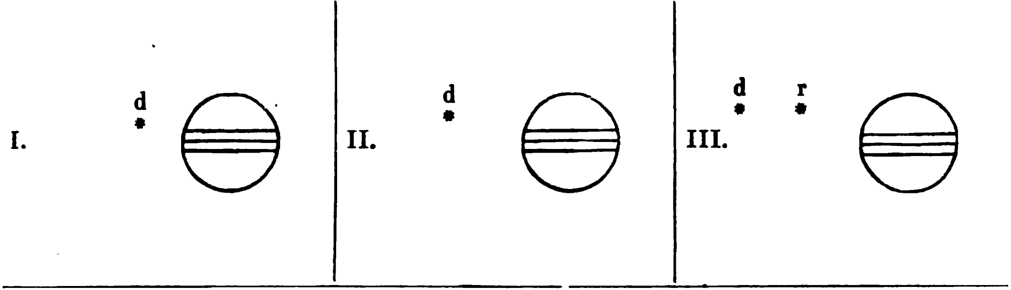
d	h	m	s				d	h	m	s				d	h	m	s			
1	14	15		II.	Sh.	In.	**11**	13	42		I.	Oc.	Re.	**21**	10	49		III.	Tr.	Eg.
	16	34		II.	* Tr.	In.	**12**	6	9		II.	Sh.	In.	**22**	1	4	28.5	I.	Ec.	Dis.
	16	38		I.	* Sh.	In.		7	28		I.	Sh.	In.		4	35		I.	Oc.	Re.
	16	51		II.	* Sh.	Eg.		8	36		II.	Tr.	In.		22	4		II.	Sh.	In.
	17	48		I.	Tr.	In.		8	42		I.	Tr.	In.		22	17		I.	Sh.	In.
	18	53		I.	Sh.	Eg.		8	46		II.	Sh.	Eg.		23	33		I.	Tr.	In.
	19	11		II.	Tr.	Eg.		9	43		I.	Sh.	Eg.	**23**	0	32		I.	Sh.	Eg.
	20	4		I.	Tr.	Eg.		10	58		I.	Tr.	Eg.		0	34		II.	Tr.	In.
2	13	52	1.2	I.	Ec.	Dis.		11	14		II.	Tr.	Eg.		0	40		II.	Sh.	Eg.
	17	17		I.	* Oc.	Re.	**13**	4	42	28.7	I.	Ec.	Dis.		1	49		I.	Tr.	Eg.
3	5	12	7.8	III.	Ec.	Dis.		8	11		I.	Oc.	Re.		3	12		II.	Tr.	Eg.
	7	37	30.8	III.	Ec.	Re.		22	57		III.	Sh.	In.		19	32	56.3	I.	Ec.	Dis.
	9	6	59.5	II.	Ec.	Dis.	**14**	0	56	41.7	II.	Ec.	Dis.		23	4		I.	Oc.	Re.
	9	54		III.	Oc.	Dis.		1	35		III.	Sh.	Eg.	**24**	16	45		I.	* Sh.	In.
	11	6		I.	Sh.	In.		1	56		I.	Sh.	In.		16	46	18.5	II.	* Ec.	Dis.
	12	17		I.	Tr.	In.		3	11		I.	Tr.	In.		17	5	32.1	III.	* Ec.	Dis.
	12	38		III.	Oc.	Re.		3	59		III.	Tr.	In.		18	2		I.	Tr.	In.
	13	21		I.	Sh.	Eg.		4	11		I.	Sh.	Eg.		19	0		I.	Sh.	Eg.
	14	2		II.	Oc.	Re.		5	27		I.	Tr.	Eg.		19	34	40.5	III.	Ec.	Re.
	14	33		I.	Tr.	Eg.		5	59		II.	Oc.	Re.		20	18		I.	Tr.	Eg.
4	8	20	21.7	I.	Ec.	Dis.		6	45		III.	Tr.	Eg.		21	52		II.	Oc.	Re.
	11	46		I.	Oc.	Re.		23	10	50.9	I.	Ec.	Dis.		22	9		III.	Oc.	Dis.
5	3	33		II.	Sh.	In.	**15**	2	40		I.	Oc.	Re.	**25**	0	57		III.	Oc.	Re.
	5	34		I.	Sh.	In.		19	27		II.	Sh.	In.		14	1	16.3	I.	Ec.	Dis.
	5	55		II.	Tr.	In.		20	24		I.	Sh.	In.		17	32		I.	Oc.	Re.
	6	10		II.	Sh.	Eg.		21	40		I.	Tr.	In.	**26**	11	13		I.	Sh.	In.
	6	46		I.	Tr.	In.		21	56		II.	Tr.	In.		11	22		II.	Sh.	In.
	7	49		I.	Sh.	Eg.		22	4		II.	Sh.	Eg.		12	30		I.	Tr.	In.
	8	32		II.	Tr.	Eg.		22	39		I.	Sh.	Eg.		13	28		I.	Sh.	Eg.
	9	2		I.	Tr.	Eg.		23	56		I.	Tr.	Eg.		13	53		II.	Tr.	In.
6	2	48	49.8	I.	Ec.	Dis.	**16**	0	34		II.	Tr.	Eg.		13	58		II.	Sh.	Eg.
	6	15		I.	Oc.	Re.		17	39	18.6	I.	Ec.	Dis.		14	46		I.	* Tr.	Eg.
	19	0		III.	Sh.	In.		21	9		I.	Oc.	Re.		16	31		II.	* Tr.	Eg.
	21	36		III.	Sh.	Eg.	**17**	13	7	42.0	III.	Ec.	Dis.	**27**	8	29	44.0	I.	Ec.	Dis.
	22	23	34.0	II.	Ec.	Dis.		14	13	14.7	II.	Ec.	Dis.		12	1		I.	Oc.	Re.
	23	52		III.	Tr.	In.		14	52		I.	Sh.	In.	**28**	5	41		I.	Sh.	In.
7	0	3		I.	Sh.	In.		15	35	35.2	III.	* Ec.	Re.		6	2	50.9	II.	Ec.	Dis.
	1	15		I.	Tr.	In.		16	8		I.	* Tr.	In.		6	52		III.	Sh.	In.
	2	18		I.	Sh.	Eg.		17	7		I.	* Sh.	Eg.		6	59		I.	Tr.	In.
	2	37		III.	Tr.	Eg.		18	8		III.	Oc.	Dis.		7	57		I.	Sh.	Eg.
	3	21		II.	Oc.	Re.		18	24		I.	Tr.	Eg.		9	15		I.	Tr.	Eg.
	3	31		I.	Tr.	Eg.		19	17		II.	Oc.	Re.		9	31		III.	Sh.	Eg.
	21	17	12.4	I.	Ec.	Dis.		20	54		III.	Oc.	Re.		11	9		II.	Oc.	Re.
8	0	44		I.	Oc.	Re.	**18**	12	7	38.6	I.	Ec.	Dis.		12	0		III.	Tr.	In.
	16	51		II.	* Sh.	In.		15	38		I.	* Oc.	Re.		14	49		III.	* Tr.	Eg.
	18	31		I.	Sh.	In.	**19**	8	46		II.	Sh.	In.	**29**	2	58	6.3	I.	Ec.	Dis.
	19	16		II.	Tr.	In.		9	20		I.	Sh.	In.		6	29		I.	Oc.	Re.
	19	28		II.	Sh.	Eg.		10	36		I.	Tr.	In.	**30**	0	9		I.	Sh.	In.
	19	44		I.	Tr.	In.		11	15		II.	Tr.	In.		0	40		II.	Sh.	In.
	20	46		I.	Sh.	Eg.		11	22		II.	Sh.	Eg.		1	27		I.	Tr.	In.
	21	53		II.	Tr.	Eg.		11	35		I.	Sh.	Eg.		2	25		I.	Sh.	Eg.
	22	0		I.	Tr.	Eg.		12	52		I.	Tr.	Eg.		3	11		II.	Tr.	In.
9	15	45	40.4	I.	* Ec.	Dis.		13	53		II.	Tr.	Eg.		3	16		II.	Sh.	Eg.
	19	13		I.	Oc.	Re.	**20**	6	36	6.5	I.	Ec.	Dis.		3	43		I.	Tr.	Eg.
10	9	9	39.0	III.	Ec.	Dis.		10	7		I.	Oc.	Re.		5	49		II.	Tr.	Eg.
	11	36	17.0	III.	Ec.	Re.	**21**	2	54		III.	Sh.	In.		21	26	34.4	I.	Ec.	Dis.
	11	40	8.9	II.	Ec.	Dis.		3	29	46.8	II.	Ec.	Dis.	**31**	0	58		I.	Oc.	Re.
	13	0		I.	Sh.	In.		3	49		I.	Sh.	In.		18	37		I.	Sh.	In.
	14	2		III.	Oc.	Dis.		5	5		I.	Tr.	In.		19	19	22.5	II.	Ec.	Dis.
	14	13		I.	Tr.	In.		5	33		III.	Sh.	Eg.		19	55		I.	Tr.	In.
	15	15		I.	* Sh.	Eg.		6	3		I.	Sh.	Eg.		20	53		I.	Sh.	Eg.
	16	29		I.	* Tr.	Eg.		7	21		I.	Tr.	Eg.		21	3	52.3	III.	Ec.	Dis.
	16	40		II.	* Oc.	Re.		8	1		III.	Tr.	In.		22	11		I.	Tr.	Eg.
	16	48		III.	* Oc.	Re.		8	35		II.	Oc.	Re.		23	34	15.7	III.	Ec.	Re.
11	10	14	0.5	I.	Ec.	Dis.														

NOTE.—In. denotes ingress: Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

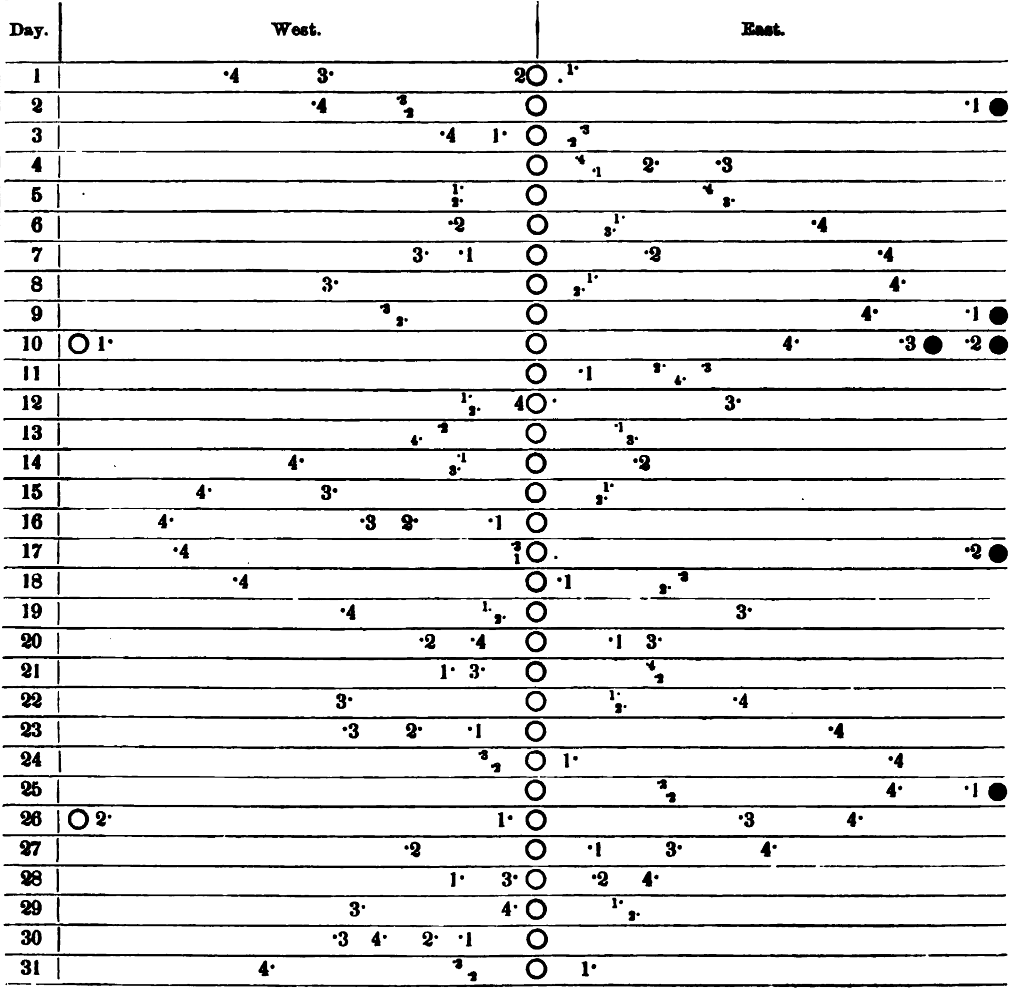
WASHINGTON MEAN TIME.

MARCH.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 16h for an Inverting Telescope.



WASHINGTON MEAN TIME.

APRIL.

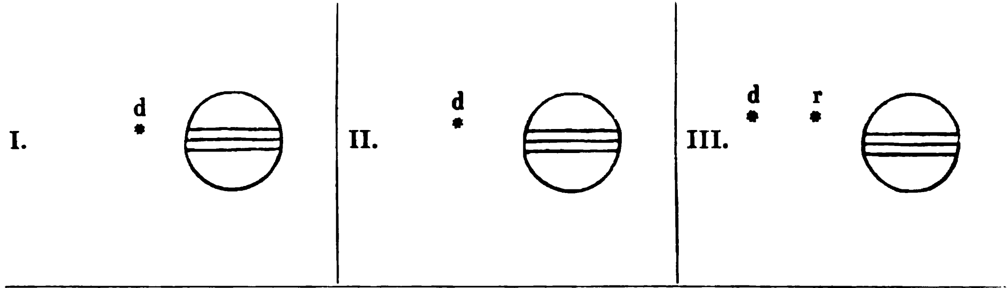
d	h	m	s			
1	0	26		II.	Oc.	Re.
	2	8		III.	Oc.	Dis.
	4	57		III.	Oc.	Re.
	15	54	54.3	I. *	Ec.	Dis.
	19	26		I.	Oc.	Re.
2	13	6		I.	Sh.	In.
	13	58		II.	Sh.	In.
	14	23		I. *	Tr.	In.
	15	21		I. *	Sh.	Eg.
	16	29		II. *	Tr.	In.
	16	35		II. *	Sh.	Eg.
	16	39		I. *	Tr.	Eg.
	19	7		II.	Tr.	Eg.
3	10	23	22.7	I.	Ec.	Dis.
	13	54		I.	Oc.	Re.
4	7	34		I.	Sh.	In.
	8	35	55.3	II.	Ec.	Dis.
	8	51		I.	Tr.	In.
	9	49		I.	Sh.	Eg.
	10	49		III.	Sh.	In.
	11	7		I.	Tr.	Eg.
	13	30		III.	Sh.	Eg.
	13	42		II.	Oc.	Re.
	15	55		III. *	Tr.	In.
	18	45		III.	Tr.	Eg.
5	4	51	45.0	I.	Ec.	Dis.
	8	22		I.	Oc.	Re.
6	2	2		I.	Sh.	In.
	3	16		II.	Sh.	In.
	3	19		I.	Tr.	In.
	4	18		I.	Sh.	Eg.
	5	35		I.	Tr.	Eg.
	5	46		II.	Tr.	In.
	5	53		II.	Sh.	Eg.
	8	24		II.	Tr.	Eg.
	23	20	13.4	I.	Ec.	Dis.
7	2	51		I.	Oc.	Re.
	20	31		I.	Sh.	In.
	21	47		I.	Tr.	In.
	21	52	27.3	II.	Ec.	Dis.
	22	47		I.	Sh.	Eg.
8	0	3		I.	Tr.	Eg.
	1	1	35.9	III.	Ec.	Dis.
	2	57		II.	Oc.	Re.
	3	33	14.3	III.	Ec.	Re.
	6	1		III.	Oc.	Dis.
	8	51		III.	Oc.	Re.
	17	48	33.9	I.	Ec.	Dis.
	21	19		I.	Oc.	Re.
9	14	59		I. *	Sh.	In.
	16	15		I. *	Tr.	In.
	16	34		II. *	Sh.	In.
	17	15		I.	Sh.	Eg.
	18	31		I.	Tr.	Eg.
	19	3		II.	Tr.	In.
	19	11		II.	Sh.	Eg.
	21	41		II.	Tr.	Eg.
10	12	17	1.8	I.	Ec.	Dis.
	15	47		I. *	Oc.	Re.
11	9	27		I.	Sh.	In.
	10	43		I.	Tr.	In.
	11	9	1.6	II.	Ec.	Dis
11	11	43		I.	Sh.	Eg.
	12	59		I.	Tr.	Eg.
	14	46		III. *	Sh.	In.
	16	12		II. *	Oc.	Re.
	17	29		III.	Sh.	Eg.
	19	47		III.	Tr.	In.
	22	37		III.	Tr.	Eg.
12	6	45	24.4	I.	Ec.	Dis.
	10	15		I.	Oc.	Re.
13	3	56		I.	Sh.	In.
	5	10		I.	Tr.	In.
	5	52		II.	Sh.	In.
	6	12		I.	Sh.	Eg.
	7	26		I.	Tr.	Eg.
	8	19		II.	Tr.	In.
	8	29		II.	Sh.	Eg.
	10	57		II.	Tr.	Eg.
14	1	13	53.1	I.	Ec.	Dis.
	4	42		I.	Oc.	Re.
	22	24		I.	Sh.	In.
	23	38		I.	Tr.	In.
15	0	25	35.6	II.	Ec.	Dis.
	0	40		I.	Sh.	Eg.
	1	54		I.	Tr.	Eg.
	4	59	15.3	III.	Ec.	Dis.
	5	26		II.	Oc.	Re.
	7	32	8.1	III.	Ec.	Re.
	9	50		III.	Oc.	Dis.
	12	41		III.	Oc.	Re.
	19	42	13.8	I.	Ec.	Dis.
	23	10		I.	Oc.	Re.
16	16	52		I.	Sh.	In.
	18	6		I.	Tr.	In.
	19	8		I.	Sh.	Eg.
	19	10		II.	Sh.	In.
	20	22		I.	Tr.	Eg.
	21	34		II.	Tr.	In.
	21	48		II.	Sh.	Eg.
17	0	12		II.	Tr.	Eg.
	14	10	42.1	I. *	Ec.	Dis.
	17	38		I.	Oc.	Re.
18	11	21		I.	Sh.	In.
	12	33		I.	Tr.	In.
	13	36		I. *	Sh.	Eg.
	13	42	12.2	II. *	Ec.	Dis.
	14	49		I. *	Tr.	Eg.
	18	40		II.	Oc.	Re.
	18	44		III.	Sh.	In.
	21	27		III.	Sh.	Eg.
	23	34		III.	Tr.	In.
19	2	24		III.	Tr.	Eg.
	8	39	5.4	I.	Ec.	Dis.
	12	5		I.	Oc.	Re.
20	5	49		I.	Sh.	In.
	7	0		I.	Tr.	In.
	8	4		I.	Sh.	Eg.
	8	28		II.	Sh.	In.
	9	16		I.	Tr.	Eg.
	10	49		II.	Tr.	In.
	11	6		II.	Sh.	Eg.
	13	27		II. *	Tr.	Eg.
21	3	7	34.6	I.	Ec.	Dis.
	6	33		I.	Oc.	Re.
22	0	17		I.	Sh.	In.
	1	27		I.	Tr.	In.
	2	32		I.	Sh.	Eg.
	2	58	48.1	II.	Ec.	Dis.
	3	43		I.	Tr.	Eg.
	7	54		II.	Oc.	Re.
	8	56	48.4	III.	Ec.	Dis.
	11	30	54.6	III.	Ec.	Re.
	13	35		III. *	Oc.	Dis.
	16	26		III. *	Oc.	Re.
	21	35	56.1	I.	Ec.	Dis.
23	1	0		I.	Oc.	Re.
	18	46		I.	Sh.	In.
	19	55		I.	Tr.	In.
	21	1		I.	Sh.	Eg.
	21	46		II.	Sh.	In.
	22	11		I.	Tr.	Eg.
24	0	3		II.	Tr.	In.
	0	24		II.	Sh.	Eg.
	2	42		II.	Tr.	Eg.
	16	4	24.9	I. *	Ec.	Dis.
	19	28		I.	Oc.	Re.
25	13	14		I. *	Sh.	In.
	14	22		I. *	Tr.	In.
	15	29		I. *	Sh.	Eg.
	16	15	27.6	II. *	Ec.	Dis.
	16	38		I.	Tr.	Eg.
	21	7		II.	Oc.	Re.
	22	42		III.	Sh.	In.
26	1	27		III.	Sh.	Eg.
	3	16		III.	Tr.	In.
	6	8		III.	Tr.	Eg.
	10	32	48.8	I.	Ec.	Dis.
	13	55		I. *	Oc.	Re.
27	7	42		I.	Sh.	In.
	8	49		I.	Tr.	In.
	9	57		I.	Sh.	Eg.
	11	4		II.	Sh.	In.
	11	5		I.	Tr.	Eg.
	13	17		II. *	Tr.	In.
	13	42		II. *	Sh.	Eg.
	15	56		II. *	Tr.	Eg.
28	5	1	18.5	I.	Ec.	Dis.
	8	23		I.	Oc.	Re.
29	2	10		I.	Sh.	In.
	3	17		I.	Tr.	In.
	4	26		I.	Sh.	Eg.
	5	32	7.4	II.	Ec.	Dis.
	5	33		I.	Tr.	Eg.
	10	19		II.	Oc.	Re.
	12	54	31.0	III. *	Ec.	Dis.
	15	29	50.4	III. *	Ec.	Re.
	17	15		III.	Oc.	Dis.
	20	6		III.	Oc.	Re.
	23	29	40.8	I.	Ec.	Dis.
30	2	50		I.	Oc.	Re.
	20	38		I.	Sh.	In.
	21	44		I.	Tr.	In.
	22	54		I.	Sh.	Eg.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

APRIL.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 15ʰ for an Inverting Telescope.

Day.	West.		East.
1	4· ·1	○	·3 ·2
2	○ 1· 4· 2	○	· ·3
3	·4 2·	○	·1 3·
4	·4 1· 3	○	·2
5	4 3·	○	·1 2·
6	·3 1· 2· ·4	○	
7	·3 ·2	○	1· ·4
8	·1	○	·3 ·2 ·4
9	○ 1·	○	2· ·3 ·4
10	2·	○	3· ·4 ·1 ●
11	1·	○	3· 4· ·2 ●
12	3·	○	·1 2· 4·
13	3· 1· 2·	○	4·
14	·3 ·2	○	1· 4·
15	·1 4·	○	·3 ·2
16	4·	○	1· 2· ·3
17	4· 2·	○	3· ·1 ●
18	4· 1·	○	3· ·2 ●
19	·4 3·	○	·1 2·
20	·4 3· 1· 2·	○	
21	·4 ·3 ·2	○	·1
22	·4 ·1	○	·2 ·3 ●
23		·4 ○	1· 2· ·3
24	2· ·1	○	·4 3·
25	○ 1· ·2	○	3· ·4
26	3·	○	·1 ·2 ·4
27	○ 2· 3· 1·	○	·4
28	·3 ·2	○	·1 4·
29	1·	○	·2 4· ·3 ●
30		○	1· 2· ·3 4·

WASHINGTON MEAN TIME.

MAY.

d	h	m	s			
1	0	0		I.	Tr.	Eg.
	0	22		II.	Sh.	In.
	2	30		II.	Tr.	In.
	3	0		II.	Sh.	Eg.
	5	9		II.	Tr.	Eg.
	17	58	10.3	I.	Ec.	Dis.
	21	17		I.	Oc.	Re.
2	15	6		I. *	Sh.	In.
	16	11		I. *	Tr.	In.
	17	22		I.	Sh.	Eg.
	18	27		I.	Tr.	Eg.
	18	48	50.2	II.	Ec.	Dis.
	23	30		II.	Oc.	Re.
3	2	40		III.	Sh.	In.
	5	26		III.	Sh.	Eg.
	6	54		III.	Tr.	In.
	9	46		III.	Tr.	Eg.
	12	26	34.7	I. *	Ec.	Dis.
	15	44		I. *	Oc.	Re.
4	9	35		I.	Sh.	In.
	10	38		I.	Tr.	In.
	11	51		I.	Sh.	Eg.
	12	54		I. *	Tr.	Eg.
	13	40		II. *	Sh.	In.
	15	43		II. *	Tr.	In.
	16	18		II. *	Sh.	Eg.
	18	22		II.	Tr.	Eg.
5	6	55	5.3	I.	Ec.	Dis.
	10	11		I.	Oc.	Re.
6	4	3		I.	Sh.	In.
	5	5		I.	Tr.	In.
	6	19		I.	Sh.	Eg.
	7	21		I.	Tr.	Eg.
	8	5	33.7	II.	Ec.	Dis.
	12	41		II. *	Oc.	Re.
	16	52	50.0	III.	Ec.	Dis.
	19	29	22.8	III.	Ec.	Re.
	20	50		III.	Oc.	Dis.
	23	42		III.	Oc.	Re.
7	1	23	28.4	I.	Ec.	Dis.
	4	38		I.	Oc.	Re.
	22	31		I.	Sh.	In.
	23	32		I.	Tr.	In.
8	0	47		I.	Sh.	Eg.
	1	48		I.	Tr.	Eg.
	2	58		II.	Sh.	In.
	4	55		II.	Tr.	In.
	5	36		II.	Sh.	Eg.
	7	34		II.	Tr.	Eg.
	19	51	58.5	I.	Ec.	Dis.
	23	5		I.	Oc.	Re.
9	17	0		I.	Sh.	In.
	17	58		I.	Tr.	In.
	19	16		I.	Sh.	Eg.
	20	14		I.	Tr.	Eg.
	21	22	20.8	II.	Ec.	Dis.
10	1	52		II.	Oc.	Re.
	6	37		III.	Sh.	In.
	9	24		III.	Sh.	Eg.
	10	27		III.	Tr.	In.
	13	19		III. *	Tr.	Eg.
	14	20	24.0	I. *	Ec.	Dis.
	17	32		I.	Oc.	Re.
11	11	28		I. *	Sh.	In.
	12	25		I. *	Tr.	In.

d	h	m	s			
11	13	44		I. *	Sh.	Eg.
	14	40		I. *	Tr.	Eg.
	16	16		II. *	Sh.	In.
	18	7		II.	Tr.	In.
	18	54		II.	Sh.	Eg.
	20	46		II.	Tr.	Eg.
12	8	48	55.4	I.	Ec.	Dis.
	11	59		I. *	Oc.	Re.
13	5	56		I.	Sh.	In.
	6	51		I.	Tr.	In.
	8	12		I.	Sh.	Eg.
	9	7		I.	Tr.	Eg.
	10	39	9.9	II.	Ec.	Dis.
	15	3		II. *	Oc.	Re.
	20	50	59.7	III.	Ec.	Dis.
	23	28	45.5	III.	Ec.	Re.
14	0	23		III.	Oc.	Dis.
	3	15		III.	Oc.	Re.
	3	17	19.5	I.	Ec.	Dis.
	6	26		I.	Oc.	Re.
15	0	25		I.	Sh.	In.
	1	18		I.	Tr.	In.
	2	41		I.	Sh.	Eg.
	3	34		I.	Tr.	Eg.
	5	34		II.	Sh.	In.
	7	18		II.	Tr.	In.
	8	13		II.	Sh.	Eg.
	9	57		II.	Tr.	Eg.
	21	45	50.6	I.	Ec.	Dis.
16	0	52		I.	Oc.	Re.
	18	53		I.	Sh.	In.
	19	44		I.	Tr.	In.
	21	9		I.	Sh.	Eg.
	22	0		I.	Tr.	Eg.
	23	56	1.4	II.	Ec.	Dis.
17	4	13		II.	Oc.	Re.
	10	35		III. *	Sh.	In.
	13	23		III. *	Sh.	Eg.
	13	56		III. *	Tr.	In.
	16	14	16.8	I.	Ec.	Dis.
	16	49		III.	Tr.	Eg.
	19	19		I.	Oc.	Re.
18	13	21		I. *	Sh.	In.
	14	11		I. *	Tr.	In.
	15	37		I. *	Sh.	Eg.
	16	27		I.	Tr.	Eg.
	18	52		II.	Sh.	In.
	20	29		II.	Tr.	In.
	21	31		II.	Sh.	Eg.
	23	8		II.	Tr.	Eg.
19	10	42	49.3	I. *	Ec.	Dis.
	13	45		I. *	Oc.	Re.
20	7	50		I.	Sh.	In.
	8	37		I.	Tr.	In.
	10	6		I.	Sh.	Eg.
	10	54		I. *	Tr.	Eg.
	13	12	56.9	II. *	Ec.	Dis.
	17	22		II.	Oc.	Re.
21	0	49	42.8	III.	Ec.	Dis.
	3	28	41.0	III.	Ec.	Re.
	3	51		III.	Oc.	Dis.
	5	11	14.7	I.	Ec.	Dis.
	6	43		III.	Oc.	Re.
	8	12		I.	Oc.	Re.

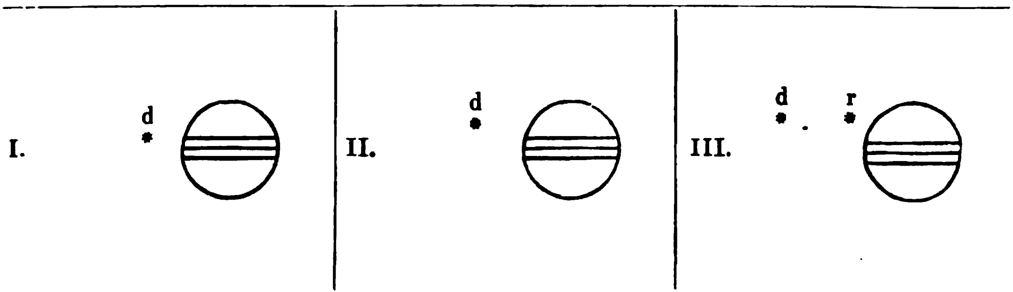
d	h	m	s			
22	2	18		I.	Sh.	In.
	3	3		I.	Tr.	In.
	4	34		I.	Sh.	Eg.
	5	21		I.	Tr.	Eg.
	8	10		II.	Sh.	In.
	9	39		II.	Tr.	In.
	10	49		II. *	Sh.	Eg.
	12	18		II. *	Tr.	Eg.
	23	39	46.5	I.	Ec.	Dis.
23	2	38		I.	Oc.	Re.
	20	46		I.	Sh.	In.
	21	29		I.	Tr.	In.
	23	3		I.	Sh.	Eg.
	23	47		I.	Tr.	Eg.
24	2	29	53.9	II.	Ec.	Dis.
	6	31		II.	Oc.	Re.
	14	33		III. *	Sh.	In.
	17	22		III.	Sh.	Eg.
	17	22		III.	Tr.	In.
	18	8	14.0	I.	Ec.	Dis.
	20	14		III.	Tr.	Eg.
	21	4		I.	Oc.	Re.
25	15	15		I. *	Sh.	In.
	15	56		I. *	Tr.	In.
	17	31		I.	Sh.	Eg.
	18	13		I.	Tr.	Eg.
	21	28		II.	Sh.	In.
	22	49		II.	Tr.	In.
26	0	7		II.	Sh.	Eg.
	1	28		II.	Tr.	Eg.
	12	36	47.7	I. *	Ec.	Dis.
	15	31		I. *	Oc.	Re.
27	9	43		I.	Sh.	In.
	10	22		I. *	Tr.	In.
	12	0		I. *	Sh.	Eg.
	12	39		I. *	Tr.	Eg.
	15	46	56.5	II. *	Ec.	Dis.
	19	39		II.	Oc.	Re.
28	4	47	53.8	III.	Ec.	Dis.
	7	5	14.3	I.	Ec.	Dis.
	9	57		I.	Oc.	Re.
	10	7		III.	Oc.	Re.
29	4	11		I.	Sh.	In.
	4	48		I.	Tr.	In.
	6	28		I.	Sh.	Eg.
	7	5		I.	Tr.	Eg.
	10	46		II. *	Sh.	In.
	11	59		II. *	Tr.	In.
	13	25		II. *	Sh.	Eg.
	14	38		II. *	Tr.	Eg.
30	1	33	47.3	I.	Ec.	Dis.
	4	23		I.	Oc.	Re.
	22	40		I.	Sh.	In.
	23	15		I.	Tr.	In.
31	0	57		I.	Sh.	Eg.
	1	31		I.	Tr.	Eg.
	5	3	59.1	II.	Ec.	Dis.
	8	47		II.	Oc.	Re.
	18	32		III.	Sh.	In.
	20	2	16.2	I.	Ec.	Dis.
	20	44		III.	Tr.	In.
	21	22		III.	Sh.	Eg.
	22	50		I.	Oc.	Re.
	23	37		III.	Tr.	Eg.

NOTE.—In. denotes ingress: Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

MAY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 13h 30m for an Inverting Telescope.

Day.	West.		East.
1	2· ·1	○	4· ·3
2	4· ·2	○	1· 3·
3	4· 3·	○	·2 ·1 ●
4	4· 3· 1·	○	2·
5	4· ·3 2·	○	·1
6	·4 1· ·3	○	·2
7	·4	○	·1 ·3 2·
8	·4 ·1 2·	○	·3
9	·4 ·2	○	1· 3·
10	·1 3·	○	·4 ·2
11	○ 1· 3·	○	2· ·4
12	·3 2·	○	·1 ·4
13	·3 1·	○	·4 ·2 ●
14	•	○	·1 ·3 2· 4·
15	·1 2·	○	·3 4·
16	·2	○	1· 3· 4·
17	·1 3	○	· ·2 4·
18	3· 1 4	○	· 2·
19	·3 4· 2·	○	·1 ●
20	4· ·3 1·	○	·2 ●
21	4·	○	·3 ·1 2·
22	4· 1· 2·	○	·3
23	·4 ·2	○	1· 3·
24	·4 ·1	○	3· ·2
25	·4 3·	○	1· 2·
26	3· 2· ·4	○	·1 ●
27	·3 ·2 1·	○	·4
28		○	·3 ·1 ·2 ·4
29	○ 2· 1·	○	·3 ·4
30	·2	○	·1 3· ·4
31	·1	○	·2 3· 4·

WASHINGTON MEAN TIME.

JUNE.

d	h	m	s			
1	17	8		I.	Sh.	In.
	17	41		I.	Tr.	In.
	19	25		I.	Sh.	Eg.
	19	57		I.	Tr.	Eg.
2	0	4		II.	Sh.	In.
	1	8		II.	Tr.	In.
	2	43		II.	Sh.	Eg.
	3	47		II.	Tr.	Eg.
	14	30	51.1	I. *	Ec.	Dis.
	17	16		I.	Oc.	Re.
3	11	37		I. *	Sh.	In.
	12	7		I. *	Tr.	In.
	13	54		I. *	Sh.	Eg.
	14	23		I. *	Tr.	Eg.
	18	21	9.2	II.	Ec.	Dis.
	21	55		II.	Oc.	Re.
4	8	46	4.3	III.	Ec.	Dis.
	8	59	19.2	I.	Ec.	Dis.
	11	42		I. *	Oc.	Re.
	13	28		III. *	Oc.	Re.
5	6	5		I.	Sh.	In.
	6	33		I.	Tr.	In.
	8	22		I.	Sh.	Eg.
	8	49		I.	Tr.	Eg.
	13	22		II. *	Sh.	In.
	14	16		II. *	Tr.	In.
	16	1		II.	Sh.	Eg.
	16	55		II.	Tr.	Eg.
6	3	27	53.2	I.	Ec.	Dis.
	6	8		I.	Oc.	Re.
7	0	34		I.	Sh.	In.
	0	59		I.	Tr.	In.
	2	51		I.	Sh.	Eg.
	3	15		I.	Tr.	Eg.
	7	38	17.6	II.	Ec.	Dis.
	11	3		II. *	Oc.	Re.
	21	56	23.5	I.	Ec.	Dis.
	22	30		III.	Sh.	In.
8	0	4		III.	Tr.	In.
	0	34		I.	Oc.	Re.
	1	21		III.	Sh.	Eg.
	2	56		III.	Tr.	Eg.
	19	2		I.	Sh.	In.
	19	25		I.	Tr.	In.
	21	19		I.	Sh.	Eg.
	21	41		I.	Tr.	Eg.
9	2	40		II.	Sh.	In.
	3	24		II.	Tr.	In.
	5	19		II.	Sh.	Eg.
	6	3		II.	Tr.	Eg.
	16	24	59.7	I.	Ec.	Dis.
	19	0		I.	Oc.	Re.
10	13	31		I. *	Sh.	In.
	13	51		I. *	Tr.	In.
	15	48		I.	Sh.	Eg.
	16	7		I.	Tr.	Eg.
	20	55	36.7	II.	Ec.	Dis.
11	0	10		II.	Oc.	Re.
	10	53	29.3	I. *	Ec.	Dis.
	12	44	14.2	III. *	Ec.	Dis.
	13	26		I. *	Oc.	Re.
	16	46		III.	Oc.	Re.
12	7	59		I.	Sh.	In.
12	8	17		I.	Tr.	In.
	9	55	15.5	IV. *	Ec.	Dis.
	10	16		I. *	Sh.	Eg.
	10	27	41.3	IV. *	Ec.	Re.
	10	33		I. *	Tr.	Eg.
	15	58		II.	Sh.	In.
	16	32		II.	Tr.	In.
	18	37		II.	Sh.	Eg.
	19	11		II.	Tr.	Eg.
13	5	22	4.6	I.	Ec.	Dis.
	7	52		I.	Oc.	Re.
14	2	28		I.	Sh.	In.
	2	43		I.	Tr.	In.
	4	45		I.	Sh.	Eg.
	4	59		I.	Tr.	Eg.
	10	12	51.4	II. *	Ec.	Dis.
	13	17		II. *	Oc.	Re.
	23	50	36.1	I.	Ec.	Dis.
15	2	18		I.	Oc.	Re.
	2	29		III.	Sh.	In.
	3	22		III.	Tr.	In.
	5	22		III.	Sh.	Eg.
	6	15		III.	Tr.	Eg.
	20	56		I.	Sh.	In.
	21	9		I.	Tr.	In.
	23	13		I.	Sh.	Eg.
	23	25		I.	Tr.	Eg.
16	5	16		II.	Sh.	In.
	5	40		II.	Tr.	In.
	7	55		II.	Sh.	Eg.
	8	19		II.	Tr.	Eg.
	18	19	14.0	I.	Ec.	Dis.
	20	44		I.	Oc.	Re.
17	15	25		I. *	Sh.	In.
	15	35		I. *	Tr.	In.
	17	42		I.	Sh.	Eg.
	17	51		I.	Tr.	Eg.
	23	30	19.5	II.	Ec.	Dis.
18	2	24		II.	Oc.	Re.
	12	47	45.2	I. *	Ec.	Dis.
	15	10		I. *	Oc.	Re.
	16	42	39.1	III.	Ec.	Dis.
	20	3		III.	Oc.	Re.
19	9	53		I. *	Sh.	In.
	10	1		I. *	Tr.	In.
	12	10		I. *	Sh.	Eg.
	12	17		I. *	Tr.	Eg.
	18	34		II.	Sh.	In.
	18	47		II.	Tr.	In.
	21	13		II.	Sh.	Eg.
	21	26		II.	Tr.	Eg.
20	7	16	22.0	I.	Ec.	Dis.
	9	36		I. *	Oc.	Re.
	18	36		IV.	Sh.	In.
	19	27		IV.	Sh.	Eg.
	19	44		IV.	Tr.	In.
	19	48		IV.	Tr.	Eg.
21	4	22		I.	Sh.	In.
	4	26		I.	Tr.	In.
	6	39		I.	Sh.	Eg.
	6	43		I.	Tr.	Eg.
	12	47	40.2	II. *	Ec.	Dis.
21	15	31		II. *	Oc.	Re.
22	1	44	55.1	I.	Ec.	Dis.
	4	2		I.	Oc.	Re.
	6	28		III.	Sh.	In.
	6	39		III.	Tr.	In.
	9	22		III. *	Sh.	Eg.
	9	31		III. *	Tr.	Eg.
	22	50		I.	Sh.	In.
	22	52		I.	Tr.	In.
23	1	7		I.	Sh.	Eg.
	1	9		I.	Tr.	Eg.
	7	52		II.	Sh.	In.
	7	54		II.	Tr.	In.
	10	31		II. *	Sh.	Eg.
	10	33		II. *	Tr.	Eg.
	20	12		I.	Oc.	Dis.
	22	28		I.	Oc	Re.
24	17	18		I.	Tr.	In.
	17	19		I.	Sh.	In.
	19	35		I.	Tr.	Eg.
	19	36		I.	Sh.	Eg.
25	2	0		II.	Oc.	Dis.
	4	39	26.8	II.	Ec.	Re.
	14	38		I. *	Oc.	Dis.
	16	54	16.9	I.	Ec.	Re.
	20	27		III.	Oc.	Dis.
	23	26	40.5	III.	Ec.	Re.
26	11	44		I. *	Tr.	In.
	11	48		I. *	Sh.	In.
	14	1		I. *	Tr.	Eg.
	14	4		I. *	Sh.	Eg.
	21	1		II.	Tr.	In.
	21	10		II.	Sh.	In.
	23	40		II.	Tr.	Eg.
	23	49		II.	Sh.	Eg.
27	9	4		I. *	Oc.	Dis.
	11	22	55.3	I. *	Ec.	Re.
28	6	10		I.	Tr.	In.
	6	16		I.	Sh.	In.
	8	27		I. *	Tr.	Eg.
	8	33		I. *	Sh.	Eg.
	15	7		II. *	Oc.	Dis.
	17	57	5.8	II.	Ec.	Re.
29	2	47		IV.	Oc.	Dis.
	3	21		IV.	Oc.	Re.
	3	30		I.	Oc.	Dis.
	3	39	16.3	IV.	Ec.	Dis.
	4	48	13.9	IV.	Ec.	Re.
	5	51	30.4	I.	Ec.	Re.
	9	55		III. *	Tr.	In.
	10	26		III. *	Sh.	In.
	12	48		III. *	Tr.	Eg.
	13	21		III. *	Sh.	Eg.
30	0	36		I.	Tr.	In.
	0	45		I.	Sh.	In.
	2	53		I.	Tr.	Eg.
	3	1		I.	Sh.	Eg.
	10	9		II. *	Tr.	In.
	10	28		II. *	Sh.	In.
	12	48		II. *	Tr.	Eg.
	13	7		II. *	Sh.	Eg.
	21	56		I.	Oc.	Dis.

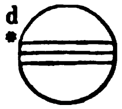
NOTE.—In. denotes ingress: Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

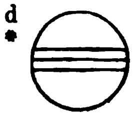
JUNE.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

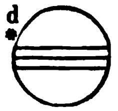
I.



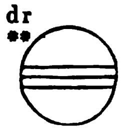
III.



II.



IV.



Configurations at 12h 30m for an Inverting Telescope.

Day.	West.		East.
1	3·	○	1· 2· 4·
2	3· 2· ·1.	○	4·
3	○ 1· ·3 ·2	○	4·
4	4·	○	·1 ·2 ·3 ●
5	4· 1·	○	2· ·3
6	4· ·2	○	·1 3·
7	4· 1·	○	·2 3·
8	·4 3·	○	1· 2·
9	·4 3· 2· ·1	○	
10	·4 ·3 ·2	○	1·
11	·4 ·	○	3 ·2 ·1 ●
12	1·	·4 ○	2· ·3
13	2·	○	·1 ·4 3·
14	1·	○	3· ·4 ·2 ●
15	3·	○	1· 2· ·4
16	3· ·1 2·	○	·4
17	·3 ·2	○	1· 4·
18	·3 ·	○	1 ·2 4·
19	1·	○	2· ·3 4·
20	2·	○	4· ·1 ·3
21	4· 1· ·	○	2 3·
22	4· 3·	○	·1 2·
23	4· 3· ·1 2·	○	
24	4· ·3 ·2	○	1·
25	·4 ·3 ·1	○	·2
26	○ 1· ·4	○	2· ·3
27	·4 2·	○	·1 ·3
28	·4 1· ·2	○	3·
29	○ 3·	○	·4 ·1 ·2
30	○ 2· 3· ·1	○	·4

WASHINGTON MEAN TIME.

JULY.

d	h	m	s			
1	0	20	11.5	I.	Ec.	Re.
	19	2		I.	Tr.	In.
	19	14		I.	Sh.	In.
	21	19		I.	Tr.	Eg.
	21	30		I.	Sh.	Eg.
2	4	14		II.	Oc.	Dis.
	7	15	5.4	II.	Ec.	Re.
	16	22		I.	Oc.	Dis.
	18	48	46.4	I.	Ec.	Re.
	23	42		III.	Oc.	Dis.
3	3	26	47.6	III.	Ec.	Re.
	13	28		I.	* Tr.	In.
	13	42		I.	* Sh.	In.
	15	45		I.	Tr.	Eg.
	15	58		I.	Sh.	Eg.
	23	16		II.	Tr.	In.
	23	46		II.	Sh.	In.
4	1	55		II.	Tr.	Eg.
	2	25		II.	Sh.	Eg.
	10	48		I.	* Oc.	Dis.
	13	17	26.0	I.	* Ec.	Re.
5	7	54		I.	Tr.	In.
	8	11		I.	* Sh.	In.
	10	11		I.	* Tr.	Eg.
	10	27		I.	* Sh.	Eg.
	17	21		II.	Oc.	Dis.
	20	32	51.1	II.	Ec.	Re.
6	5	14		I.	Oc.	Dis.
	7	46	2.5	I.	Ec.	Re.
	13	12		III.	* Tr.	In.
	14	25		III.	* Sh.	In.
	16	5		III.	Tr.	Eg.
	17	21		III.	Sh.	Eg.
7	2	20		I.	Tr.	In.
	2	39		I.	Sh.	In.
	4	37		I.	Tr.	Eg.
	4	56		I.	Sh.	Eg.
	9	44		IV.	* Tr.	In.
	10	30		IV.	* Tr.	Eg.
	12	24		II.	* Tr.	In.
	12	28		IV.	* Sh.	In.
	13	4		II.	* Sh.	In.
	13	47		IV.	* Sh.	Eg.
	15	3		II.	Tr.	Eg.
	15	44		II.	Sh.	Eg.
	23	40		I.	Oc.	Dis.
8	2	14	44.7	I.	Ec.	Re.
	20	46		I.	Tr.	In.
	21	8		I.	Sh.	In.
	23	3		I.	Tr.	Eg.
	23	24		I.	Sh.	Eg.
9	6	29		II.	Oc.	Dis.
	9	51	1.0	II.	* Ec.	Re.
	18	6		I.	Oc.	Dis.
	20	43	21.4	I.	Ec.	Re.
10	3	2		III.	Oc.	Dis.
	7	27	28.5	III.	Ec.	Re.
	15	12		I.	Tr.	In.
	15	36		I.	Sh.	In.
	17	29		I.	Tr.	Eg.
	17	53		I.	Sh.	Eg.
11	1	32		II.	Tr.	In.
	2	22		II.	Sh.	In.
	4	11		II.	Tr.	Eg.
	5	2		II.	Sh.	Eg.
	12	32		I.	* Oc.	Dis.
	15	12	2.2	I.	Ec.	Re.

d	h	m	s			
12	9	39		I.	* Tr.	In.
	10	5		I.	* Sh.	In.
	11	55		I.	* Tr.	Eg.
	12	22		I.	* Sh.	Eg.
	19	37		II.	Oc.	Dis.
	23	8	53.0	II.	Ec.	Re.
13	6	58		I.	Oc.	Dis.
	9	40	39.9	I.	* Ec.	Re.
	16	31		III.	Tr.	In.
	18	24		III.	Sh.	In.
	19	24		III.	Tr.	Eg.
	21	21		III.	Sh.	Eg.
14	4	5		I.	Tr.	In.
	4	33		I.	Sh.	In.
	6	21		I.	Tr.	Eg.
	6	50		I.	Sh.	Eg.
	14	40		II.	Tr.	In.
	15	40		II.	Sh.	In.
	17	19		II.	Tr.	Eg.
	18	20		II.	Sh.	Eg.
15	1	25		I.	Oc.	Dis.
	4	9	23.5	I.	Ec.	Re.
	16	59		IV.	Oc.	Dis.
	17	53		IV.	Oc.	Re.
	21	31	3.5	IV.	Ec.	Dis.
	22	31		I.	Tr.	In.
	23	2		I.	Sh.	In.
	23	2	52.3	IV.	Ec.	Re.
16	0	47		I.	Tr.	Eg.
	1	19		I.	Sh.	Eg.
	8	45		II.	* Oc.	Dis.
	12	27	13.2	II.	* Ec.	Re.
	19	51		I.	Oc.	Dis.
	22	38	1.3	I.	Ec.	Re.
17	6	22		III.	Oc.	Dis.
	11	27	38.4	III.	* Ec.	Re.
	16	58		I.	Tr.	In.
	17	31		I.	Sh.	In.
	19	14		I.	Tr.	Eg.
	19	48		I.	Sh.	Eg.
18	3	48		II.	Tr.	In.
	4	58		II.	Sh.	In.
	6	28		II.	Tr.	Eg.
	7	38		II.	Sh.	Eg.
	14	17		I.	Oc.	Dis.
	17	6	43.4	I.	Ec.	Re.
19	11	24		I.	* Tr.	In.
	11	59		I.	* Sh.	In.
	13	40		I.	* Tr.	Eg.
	14	16		I.	Sh.	Eg.
	21	54		II.	Oc.	Dis.
20	1	45	11.1	II.	Ec.	Re.
	8	43		I.	* Oc.	Dis.
	11	35	22.7	I.	* Ec.	Re.
	19	52		III.	Tr.	In.
	22	23		III.	Sh.	In.
	22	46		III.	Tr.	Eg.
21	1	22		III.	Sh.	Eg.
	5	50		I.	Tr.	In.
	6	28		I.	Sh.	In.
	8	6		I.	* Tr.	Eg.
	8	45		I.	* Sh.	Eg.
	16	57		II.	Tr.	In.
	18	16		II.	Sh.	In.
	19	37		II.	Tr.	Eg.
	20	56		II.	Sh.	Eg.

d	h	m	s			
22	3	10		I.	Oc.	Dis.
	6	4	7.2	I.	Ec.	Re.
23	0	17		I.	Tr.	In.
	0	57		I.	Sh.	In.
	2	33		I.	Tr.	Eg.
	3	14		I.	Sh.	Eg.
	11	3		II.	* Oc.	Dis.
	15	3	41.4	II.	Ec.	Re.
	21	36		I.	Oc.	Dis.
24	0	13		IV.	Tr.	In.
	0	32	46.5	I.	Ec.	Re.
	1	18		IV.	Tr.	Eg.
	6	24		IV.	Sh.	In.
	8	4		IV.	* Sh.	Eg.
	9	44		III.	* Oc.	Dis.
	12	38		III.	* Oc.	Re.
	12	38	15.8	III.	* Ec.	Dis.
	15	27	47.4	III.	Ec.	Re.
	18	43		I.	Tr.	In.
	19	25		I.	Sh.	In.
	20	59		I.	Tr.	Eg.
	21	42		I.	Sh.	Eg.
25	6	6		II.	Tr.	In.
	7	34		II.	Sh.	In.
	8	46		II.	* Tr.	Eg.
	10	14		II.	* Sh.	Eg.
	16	3		I.	Oc.	Dis.
	19	1	29.5	I.	Ec.	Re.
26	13	10		I.	* Tr.	In.
	13	54		I.	Sh.	In.
	15	26		I.	Tr.	Eg.
	16	11		I.	Sh.	Eg.
27	0	12		II.	Oc.	Dis.
	4	21	45.0	II.	Ec.	Re.
	10	29		I.	* Oc.	Dis.
	13	30	9.8	I.	Ec.	Re.
	23	17		III.	Tr.	In.
28	2	11		III.	Tr.	Eg.
	2	23		III.	Sh.	In.
	5	21		III.	Sh.	Eg.
	7	37		I.	Tr.	In.
	8	23		I.	* Sh.	In.
	9	53		I.	* Tr.	Eg.
	10	40		I.	* Sh.	Eg.
	19	16		II.	Tr.	In.
	20	52		II.	Sh.	In.
	21	56		II.	Tr.	Eg.
	23	32		II.	Sh.	Eg.
29	4	56		I.	Oc.	Dis.
	7	58	55.3	I.	* Ec.	Re.
30	2	3		I.	Tr.	In.
	2	52		I.	Sh.	In.
	4	20		I.	Tr.	Eg.
	5	9		I.	Sh.	Eg.
	13	22		II.	Oc.	Dis.
	17	40	25.2	II.	Ec.	Re.
	23	23		I.	Oc.	Dis.
31	2	27	35.9	I.	Ec.	Re.
	13	10		III.	Oc.	Dis.
	16	4		III.	Oc.	Re.
	16	37	17.0	III.	Ec.	Dis.
	19	27	56.0	III.	Ec.	Re.
	20	30		I.	Tr.	In.
	21	21		I.	Sh.	In.
	22	47		I.	Tr.	Eg.
	23	38		I.	Sh.	Eg.

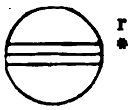
NOTE.—In. denotes ingress: Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

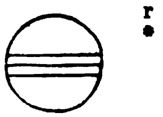
JULY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

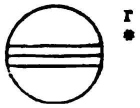
I.



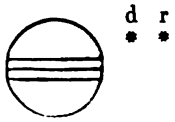
III.



II.



IV.



Configurations at 11ʰ for an Inverting Telescope.

Day.	West.		East.
1	·3 ·2	○	1· ·4
2	·3 ·1	○	·2 ·4
3		○	1· ·3 2· 4·
4	2·	○	·3 4· ·1 ●
5	·2 1·	○	3· 4·
6		○	3· ·1 ·2 4·
7	3· 1· ·2 4	○	·
8	·3 4· ·2	○	·1
9	4· ·3 ·1	○	·2
10	4·	○	·3 1· 2·
11	4· 2· ·1	○	·3
12	○ 1· ·4 ·2	○	3·
13	·4	○	·1 3· ·2
14	·4 3· 1·	○	2·
15	3· 2· ·4	○	·1
16	·3 ·1	○	·4 ·2 ●
17		○	1· 2· ·4 ·3 ●
18	2· ·1	○	·3 ·4
19	·2 1	○	· 3· ·4
20		○	3· ·2 4· ·1 ●
21	3· 1·	○	2· 4·
22	3· 2·	○	·1 4·
23	·3 1· ·	○	2 4·
24	4·	○	1· 2· ·3 ●
25	4· ·1 2·	○	·3
26	4· ·2	○	1· 3·
27	4·	○	·2 3· ·1 ●
28	·4 3· 1·	○	2·
29	·4 3· 2·	○	·1
30	·4 ·3 1· ·2	○	
31	·4 ·	○	3 ·1 ·2

WASHINGTON MEAN TIME.

AUGUST.

d	h	m	s			
1	7	46		IV.	Oc.	Dis.
	8	26		II. *	Tr.	In.
	8	56		IV. *	Oc.	Re.
	10	10		II. *	Sh.	In.
	11	6		II. *	Tr.	Eg.
	12	50		II. *	Sh.	Eg.
	15	26	29.5	IV.	Ec.	Dis.
	17	16	35.3	IV.	Ec.	Re.
	17	50		I.	Oc.	Dis.
	20	56	19.9	I.	Ec.	Re.
2	14	57		I.	Tr.	In.
	15	50		I.	Sh.	In.
	17	14		I.	Tr.	Eg.
	18	7		I.	Sh.	Eg.
3	2	33		II.	Oc.	Dis.
	6	58	34.3	II.	Ec.	Re.
	12	16		I. *	Oc.	Dis.
	15	25	1.4	I.	Ec.	Re.
4	2	46		III.	Tr.	In.
	5	40		III.	Tr.	Eg.
	6	23		III.	Sh.	In.
	9	24		III. *	Sh.	Eg.
	9	24		I. *	Tr.	In.
	10	18		I. *	Sh.	In.
	11	41		I. *	Tr.	Eg.
	12	35		I. *	Sh.	Eg.
	21	36		II.	Tr.	In.
	23	27		II.	Sh.	In.
5	0	16		II.	Tr.	Eg.
	2	8		II.	Sh.	Eg.
	6	43		I.	Oc.	Dis.
	9	53	47.6	I. *	Ec.	Re.
6	3	51		I.	Tr.	In.
	4	47		I.	Sh.	In.
	6	8		I.	Tr.	Eg.
	7	4		I.	Sh.	Eg.
	15	44		II.	Oc.	Dis.
	20	17	23.8	II.	Ec.	Re.
7	1	10		I.	Oc.	Dis.
	4	22	29.2	I.	Ec.	Re.
	16	40		III.	Oc.	Dis.
	19	35		III.	Oc.	Re.
	20	36	31.2	III.	Ec.	Dis.
	22	18		I.	Tr.	In.
	23	16		I.	Sh.	In.
	23	28	17.0	III.	Ec.	Re.
8	0	35		I.	Tr.	Eg.
	1	33		I.	Sh.	Eg.
	10	47		II. *	Tr.	In.
	12	45		II.	Sh.	In.
	13	27		II.	Tr.	Eg.
	15	26		II.	Sh.	Eg.
	19	37		I.	Oc.	Dis.
	22	51	13.7	I.	Ec.	Re.
9	15	30		IV.	Tr.	In.
	16	45		I.	Tr.	In.
	16	49		IV.	Tr.	Eg.
	17	45		I.	Sh.	In.
	19	2		I.	Tr.	Eg.
	20	2		I.	Sh.	Eg.
10	0	21		IV.	Sh.	In.
	2	20		IV.	Sh.	Eg.
	4	55		II.	Oc.	Dis
	9	35	37.6	II. *	Ec.	Re.
	14	5		I.	Oc.	Dis.
	17	19	56.0	I.	Ec.	Re.
11	6	19		III.	Tr.	In.
	9	13		III. *	Tr.	Eg.
	10	23		III. *	Sh.	In.
11	11	12		I. *	Tr.	In.
	12	14		I. *	Sh.	In.
	13	24		III.	Sh.	Eg.
	13	29		I.	Tr.	Eg.
	14	31		I.	Sh.	Eg.
	23	58		II.	Tr.	In.
12	2	3		II.	Sh.	In.
	2	38		II.	Tr.	Eg.
	4	44		II.	Sh.	Eg.
	8	32		I. *	Oc.	Dis.
	11	48	43.1	I. *	Ec.	Re.
13	5	40		I.	Tr.	In.
	6	43		I.	Sh.	In.
	7	57		I. *	Tr.	Eg.
	9	0		I. *	Sh.	Eg.
	18	7		II.	Oc.	Dis.
	22	54	36.1	II.	Ec.	Re.
14	2	59		I.	Oc.	Dis.
	6	17	25.6	I.	Ec.	Re.
	20	15		III.	Oc.	Dis.
	23	10		III.	Oc.	Re.
15	0	7		I.	Tr.	In.
	0	36	25.1	III.	Ec.	Dis.
	1	11		I.	Sh.	In.
	2	24		I.	Tr.	Eg.
	3	28		I.	Sh.	Eg.
	3	29	17.1	III.	Ec.	Re.
	13	10		II.	Tr.	In.
	15	21		II.	Sh.	In.
	15	50		II.	Tr.	Eg.
	18	2		II.	Sh.	Eg.
	21	26		I.	Oc.	Dis.
16	0	46	10.6	I.	Ec.	Re.
	18	35		I.	Tr.	In.
	19	40		I.	Sh.	In.
	20	52		I.	Tr.	Eg.
	21	57		I.	Sh.	Eg.
17	7	20		II.	Oc.	Dis.
	12	12	54.4	II.	Ec.	Re.
	15	54		I.	Oc.	Dis.
	19	14	53.7	I.	Ec.	Re.
	23	22		IV.	Oc.	Dis.
18	0	48		IV.	Oc.	Re.
	9	23	17.3	IV. *	Ec.	Dis.
	9	55		III. *	Tr.	In.
	11	29	3.3	IV. *	Ec.	Re.
	12	51		III.	Tr.	Eg.
	13	2		I.	Tr.	In.
	14	9		I.	Sh.	In.
	14	22		III.	Sh.	In.
	15	19		I.	Tr.	Eg.
	16	26		I.	Sh.	Eg.
	17	25		III.	Sh.	Eg.
19	2	22		II.	Tr.	In.
	4	38		II.	Sh.	In.
	5	2		II.	Tr.	Eg.
	7	20		II.	Sh.	Eg.
	10	21		I. *	Oc.	Dis.
	13	43	41.1	I.	Ec.	Re.
20	7	30		I. *	Tr.	In.
	8	37		I. *	Sh.	In.
	9	47		I. *	Tr.	Eg.
	10	55		I. *	Sh.	Eg.
	20	34		II.	Oc.	Dis.
21	1	32	0.9	II.	Ec.	Re.
	4	49		I.	Oc.	Dis.
	8	12	24.6	I. *	Ec.	Re.
	23	54		III.	Oc.	Dis.
22	1	57		I.	Tr.	In.
22	2	50		III.	Oc.	Re.
	3	6		I.	Sh.	In.
	4	14		I.	Tr.	Eg.
	4	36	5.3	III.	Ec.	Dis.
	5	24		I.	Sh.	Eg.
	7	30	3.1	III. *	Ec.	Re.
	15	35		II.	Tr.	In.
	17	56		II.	Sh.	In.
	18	15		II.	Tr.	Eg.
	20	38		II.	Sh.	Eg.
	23	16		I.	Oc.	Dis.
23	2	41	10.0	I.	Ec.	Re.
	20	25		I.	Tr.	In.
	21	35		I.	Sh.	In.
	22	42		I.	Tr.	Eg.
	23	53		I.	Sh.	Eg.
24	9	48		II. *	Oc.	Dis.
	14	50	23.1	II.	Ec.	Re.
	17	44		I.	Oc.	Dis.
	21	9	53.6	I.	Ec.	Re.
25	13	37		III.	Tr.	In.
	14	53		I.	Tr.	In.
	16	3		I.	Sh.	In.
	16	33		III.	Tr.	Eg.
	17	10		I.	Tr.	Eg.
	18	21		I.	Sh.	Eg.
	18	22		III.	Sh.	In.
	21	26		III.	Sh.	Eg.
26	4	48		II.	Tr.	In.
	7	14		II.	Sh.	In.
	7	28		II. *	Tr.	Eg.
	7	39		IV. *	Tr.	In.
	9	12		IV. *	Tr.	Eg.
	9	56		II. *	Sh.	Eg.
	12	12		I.	Oc.	Dis.
	15	38	41.4	I.	Ec.	Re.
	18	22		IV.	Sh.	In.
	20	36		IV.	Sh.	Eg.
27	9	21		I. *	Tr.	In.
	10	32		I. *	Sh.	In.
	11	38		I.	Tr.	Eg.
	12	50		I.	Sh.	Eg.
	23	2		II.	Oc.	Dis.
28	4	9	37.0	II.	Ec.	Re.
	6	40		I.	Oc.	Dis.
	10	7	25.5	I. *	Ec.	Re.
29	3	38		III.	Oc.	Dis.
	3	49		I.	Tr.	In.
	5	1		I.	Sh.	In.
	6	6		I.	Tr.	Eg.
	6	35		III.	Oc.	Re.
	7	19		I. *	Sh.	Eg.
	8	36	14.3	III. *	Ec.	Dis.
	11	31	17.3	III.	Ec.	Re.
	18	2		II.	Tr.	In.
	20	32		II.	Sh.	In.
	20	42		II.	Tr.	Eg.
	23	14		II.	Sh.	Eg.
30	1	8		I.	Oc.	Dis
	4	36	11.2	I.	Ec.	Re.
	22	17		I.	Tr.	In.
	23	30		I.	Sh.	In.
31	0	34		I.	Tr.	Eg.
	1	48		I.	Sh.	Eg.
	12	17		II.	Oc.	Dis.
	17	28	2.6	II.	Ec.	Re.
	19	36		I.	Oc.	Dis.
	23	4	55.3	I.	Ec.	Re.

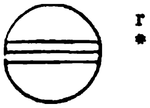
NOTE.- In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

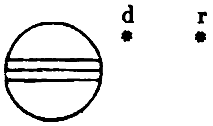
AUGUST.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

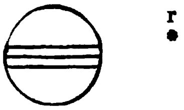
I.



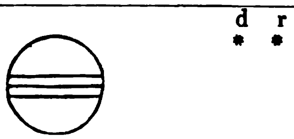
III.



II.



IV.



Configurations at 10h for an Inverting Telescope.

Day.	West.		East.
1	○ 2· ·1	○	·3 ·4 ●
2	·2	○	1· ·4 3·
3	·1	○	·2 3· ·4
4	○ 1· 3·	○	2· ·4
5	3· 2·	○	·1 ·4
6	·3 2 1·	○	4·
7	·3	○	·1 ·2 4·
8	1· 2	○	· ·3 4·
9	·2	○	4· 1· ·3
10	4· ·1	○	·2 3·
11	4· 3·	○	1· 2·
12	4· 3· 2·	○	· ·1 ●
13	4· ·3 ·2 1·	○	
14	·4 ·3	○	·1 ·2
15	·4 1·	○	2· ·3
16	·4 2·	○	1· ·3
17	4 ·1	○	3· ·2 ●
18	○ 3·	○	1· 2· ·4 ●
19	3· 2· ·	○	1 ·4
20	·3 ·2 1·	○	·4
21	·3	○	·1 ·2 ·4
22	1·	○	2· ·3 4·
23	2·	○	·1 ·3 4·
24	·1	○	3· 4· ·2 ●
25		○	3· 1· 2· 4·
26	3· 2· ·1 4	○	·
27	○ 1· 3· 4· ·2	○	
28	4· ·3	○	·2 ·1 ●
29	4· 1·	○	2· ·3 ●
30	4· 2·	○	·1 ·3
31	·4 1· ·2	○	3·

WASHINGTON MEAN TIME.

SEPTEMBER.

d	h	m	s			
1	16	45		I.	Tr.	In.
	17	23		III.	Tr.	In.
	17	59		I.	Sh.	In.
	19	2		I.	Tr.	Eg.
	20	17		I.	Sh.	Eg.
	20	20		III.	Tr.	Eg.
	22	22		III.	Sh.	In.
2	1	27		III.	Sh.	Eg.
	7	16		II.	*Tr.	In.
	9	49		II.	*Sh.	In.
	9	57		II.	*Tr.	Eg.
	12	31		II.	Sh.	Eg.
	14	4		I.	Oc.	Dis.
	17	33	43.1	I.	Ec.	Re.
3	11	13		I.	Tr.	In.
	12	28		I.	Sh.	In.
	13	30		I.	Tr.	Eg.
	14	46		I.	Sh.	Eg.
	15	55		IV.	Oc.	Dis.
	17	36		IV.	Oc.	Re.
4	1	33		II.	Oc.	Dis.
	3	21	35.2	IV.	Ec.	Dis.
	5	41	14.4	IV.	Ec.	Re.
	6	47	23.3	II.	Ec.	Re.
	8	32		I.	*Oc.	Dis.
	12	2	28.0	I.	Ec.	Re.
5	5	41		I.	Tr.	In.
	6	57		I.	Sh.	In.
	7	26		III.	*Oc.	Dis.
	7	58		I.	*Tr.	Eg.
	9	14		I.	*Sh.	Eg.
	10	24		III.	*Oc.	Re.
	12	35	48.6	III.	Ec.	Dis.
	15	31	56.4	III.	Ec.	Re.
	20	31		II.	Tr.	In.
	23	7		II.	Sh.	In.
	23	12		II.	Tr.	Eg.
6	1	49		II.	Sh.	Eg.
	3	0		I.	Oc.	Dis.
	6	31	13.8	I.	Ec.	Re.
7	0	10		I.	Tr.	In.
	1	26		I.	Sh.	In.
	2	27		I.	Tr.	Eg.
	3	43		I.	Sh.	Eg.
	14	50		II.	Oc.	Dis.
	20	5	52.0	II.	Ec.	Re.
	21	28		I.	Oc.	Dis.
8	0	59	57.8	I.	Ec.	Re.
	18	38		I.	Tr.	In.
	19	55		I.	Sh.	In.
	20	55		I.	Tr.	Eg.
	21	14		III.	Tr.	In.
	22	12		I.	Sh.	Eg.
9	0	12		III.	Tr.	Eg.
	2	22		III.	Sh.	In.
	5	28		III.	Sh.	Eg.
	9	47		II.	*Tr.	In.
	12	24		II.	Sh.	In.
	12	28		II.	Tr.	Eg.
	15	7		II.	Sh.	Eg.
	15	56		I.	Oc.	Dis.
	19	28	45.9	I.	Ec.	Re.
10	13	7		I.	Tr.	In.
	14	24		I.	Sh.	In.
	15	24		I.	Tr.	Eg.
	16	41		I.	Sh.	Eg.
11	4	7		II.	Oc.	Dis.
	9	25	18.3	II.	*Ec.	Re.
	10	25		I.	*Oc.	Dis.
11	13	57	30.6	I.	Ec.	Re.
12	0	42		IV.	Tr.	In.
	2	31		IV.	Tr.	Eg.
	7	35		I.	*Tr.	In.
	8	53		I.	*Sh.	In.
	9	52		I.	*Tr.	Eg.
	11	10		I.	Sh.	Eg.
	11	18		III.	Oc.	Dis.
	12	23		IV.	Sh.	In.
	14	17		III.	Oc.	Re.
	14	51		IV.	Sh.	Eg.
	16	35	16.9	III.	Ec.	Dis.
	19	32	29.5	III.	Ec.	Re.
	23	3		II.	Tr.	In.
13	1	42		II.	Sh.	In.
	1	44		II.	Tr.	Eg.
	4	25		II.	Sh.	Eg.
	4	53		I.	Oc.	Dis.
	8	26	16.5	I.	*Ec.	Re.
14	2	4		I.	Tr.	In.
	3	22		I.	Sh.	In.
	4	21		I.	Tr.	Eg.
	5	39		I.	Sh.	Eg.
	17	24		II.	Oc.	Dis.
	22	43	49.4	II.	Ec.	Re.
	23	22		I.	Oc.	Dis.
15	2	55	0.8	I.	Ec.	Re.
	20	32		I.	Tr.	In.
	21	50		I.	Sh.	In.
	22	49		I.	Tr.	Eg.
16	0	8		I.	Sh.	Eg.
	1	9		III.	Tr.	In.
	4	8		III.	Tr.	Eg.
	6	22		III.	Sh.	In.
	9	29		III.	*Sh.	Eg.
	12	20		II.	Tr.	In.
	14	59		II.	Sh.	In.
	15	1		II.	Tr.	Eg.
	17	42		II.	Sh.	Eg.
	17	50		I.	Oc.	Dis.
	21	23	48.8	I.	Ec.	Re.
17	15	1		I.	Tr.	In.
	16	19		I.	Sh.	In.
	17	18		I.	Tr.	Eg.
	18	37		I.	Sh.	Eg.
18	6	43		II.	Oc.	Dis.
	12	3	21.1	II.	Ec.	Re.
	12	19		I.	Oc.	Dis.
	15	52	33.6	I.	Ec.	Re.
19	9	30		I.	*Tr.	In.
	10	48		I.	Sh.	In.
	11	47		I.	Tr.	Eg.
	13	6		I.	Sh.	Eg.
	15	15		III.	Oc.	Dis.
	18	15		III.	Oc.	Re.
	20	34	43.2	III.	Ec.	Dis.
	23	32	59.8	III.	Ec.	Re.
20	1	37		II.	Tr.	In.
	4	17		II.	Sh.	In.
	4	18		II.	Tr.	Eg.
	6	48		I.	*Oc.	Dis.
	7	0		II.	*Sh.	Eg.
	9	25		IV.	*Oc.	Dis.
	10	21	19.3	I.	Ec.	Re.
	11	21		IV.	Oc.	Re.
	21	21	37.1	IV.	Ec.	Dis.
	23	53	43.5	IV.	Ec.	Re.
21	3	59		I.	Tr.	In.
21	5	17		I.	Sh.	In.
	6	16		I.	Tr.	Eg.
	7	35		I.	*Sh.	Eg.
	20	1		II.	Oc.	Dis.
22	1	16		I.	Oc.	Dis.
	1	21	53.6	II.	Ec.	Re.
	4	50	3.7	I.	Ec.	Re.
	22	28		I.	Tr.	In.
	23	46		I.	Sh.	In.
23	0	45		I.	Tr.	Eg.
	2	4		I.	Sh.	Eg.
	5	9		III.	Tr.	In.
	8	9		III.	*Tr.	Eg.
	10	23		III.	Sh.	In.
	13	31		III.	Sh.	Eg.
	14	55		II.	Tr.	In.
	17	34		II.	Sh.	In.
	17	36		II.	Tr.	Eg.
	19	45		I.	Oc.	Dis.
	20	18		II.	Sh.	Eg.
	23	18	51.3	I.	Ec.	Re.
24	16	57		I.	Tr.	In.
	18	15		I.	Sh.	In.
	19	14		I.	Tr.	Eg.
	20	33		I.	Sh.	Eg.
25	9	21		II.	*Oc.	Dis.
	14	14		I.	Oc.	Dis.
	14	41	28.5	II.	Ec.	Re.
	17	47	36.5	I.	Ec.	Re.
26	11	26		I.	Tr.	In.
	12	43		I.	*Sh.	In.
	13	43		I.	*Tr.	Eg.
	15	1		I.	Sh.	Eg.
	19	16		III.	Oc.	Dis.
	22	17		III.	Oc.	Re.
27	0	34	17.9	III.	Ec.	Dis.
	3	33	37.1	III.	Ec.	Re.
	4	13		II.	Tr.	In.
	6	52		II.	*Sh.	In.
	6	54		II.	*Tr.	Eg.
	8	43		I.	*Oc.	Dis.
	9	36		II.	Sh.	Eg.
	12	16	21.7	I.	Ec.	Re.
28	5	55		I.	Tr.	In.
	7	12		I.	*Sh.	In.
	8	12		I.	*Tr.	Eg.
	9	30		I.	Sh.	Eg.
	18	40		IV.	Tr.	In.
	20	44		IV.	Tr.	Eg.
	22	40		II.	Oc.	Dis.
29	3	12		I.	Oc.	Dis.
	4	0	2.7	II.	Ec.	Re.
	6	25		IV.	Sh.	In.
	6	45	6.1	I.	*Ec.	Re.
	9	5		IV.	*Sh.	Eg.
30	0	24		I.	Tr.	In.
	1	41		I.	Sh.	In.
	2	41		I.	Tr.	Eg.
	3	59		I.	Sh.	Eg.
	9	12		III.	*Tr.	In.
	12	13		III.	Tr.	Eg.
	14	23		III.	Sh.	In.
	17	31		II.	Tr.	In.
	17	32		III.	Sh.	Eg.
	20	9		II.	Sh.	In.
	20	13		II.	Tr.	Eg.
	21	41		I.	Oc.	Dis.
	22	53		II.	Sh.	Eg.

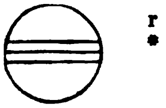
NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; *Visible at Washington.

WASHINGTON MEAN TIME.

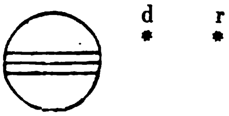
SEPTEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

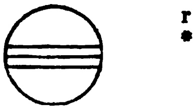
I.



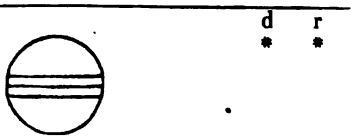
III.



II.



IV.



Configurations at 8ʰ 30ᵐ for an Inverting Telescope.

Day.	West.		East.
1	·4	○	3· 1· ·2
2	○ 2· ·4 3· ·1	○	
3	3· ·2 ·4	○	1·
4	·3	·○1	·2 ·4
5	1·	○	2· ·4 ·3 ●
6	2·	○	·1 ·3 ·4
7	1· ·2	○	3· ·4
8		○	·1 3· ·2 4·
9	·1 3·	2○ ·	4·
10	3· ·2	○	1· 4·
11	·3 ·1	○	·2 4·
12	○ 1· 4· ·3	○	2·
13	4· 2·	○	·1 ·3
14	4· ·2 1·	○	3·
15	4·	○	·1 ·2 3·
16	·4 ·1 3·	○	2·
17	·4 3· 2·	○	1·
18	·4 ·3 ·1	○	·2 ●
19	·4 ·3	○	1· 2·
20	2·	·○^{4}	·3 ·1 ●
21	·2 1·	○	·4 ·3
22		○	·1 ·2 3· ·4
23	1· 3·	○	2· ·4
24	3· 2·	○	1· ·4
25	·3 ·1	·○2	4·
26	·3	○	1· 2· 4·
27	2·	·○^{1}	·3 4·
28	·2 1·	○	4· ·3
29	4·	○	·1 ·2 3·
30	4· 1·	3○·	2·

WASHINGTON MEAN TIME.

OCTOBER.

d	h	m	s			
1	1	13	53.1	I.	Ec.	Re.
	18	53		I.	Tr.	In.
	20	10		I.	Sh.	In.
	21	10		I.	Tr.	Eg.
	22	28		I.	Sh.	Eg.
2	12	1		II.	Oc.	Dis.
	16	10		I.	Oc.	Dis.
	17	19	40.6	II.	Ec.	Re.
	19	42	38.3	I.	Ec.	Re.
3	13	22		I.	Tr.	In.
	14	39		I.	Sh.	In.
	15	39		I.	Tr.	Eg.
	16	57		I.	Sh.	Eg.
	23	22		III.	Oc.	Dis.
4	2	23		III.	Oc.	Re.
	4	34	28.5	III.	Ec.	Dis.
	6	50		II.*	Tr.	In.
	7	34	49.5	III.*	Ec.	Re.
	9	27		II.	Sh.	In.
	9	32		II.	Tr.	Eg.
	10	39		I.	Oc.	Dis.
	12	11		II.	Sh.	Eg.
	14	11	22.9	I.	Ec.	Re.
5	7	52		I.*	Tr.	In.
	9	8		I.	Sh.	In.
	10	9		I.	Tr.	Eg.
	11	26		I.	Sh.	Eg.
6	1	21		II.	Oc.	Dis.
	5	8		I.	Oc.	Dis.
	6	38	15.0	II.*	Ec.	Re.
	8	40	7.2	I.*	Ec.	Re.
7	2	21		I.	Tr.	In.
	3	37		I.	Sh.	In.
	3	46		IV.	Oc.	Dis.
	4	38		I.	Tr.	Eg.
	5	55		I.	Sh.	Eg.
	5	58		IV.	Oc.	Re.
	13	19		III.	Tr.	In.
	15	21	42.2	IV.	Ec.	Dis.
	16	21		III.	Tr.	Eg.
	18	5	9.8	IV.	Ec.	Re.
	18	23		III.	Sh.	In.
	20	10		II.	Tr.	In.
	21	33		III.	Sh.	Eg.
	22	44		II.	Sh.	In.
	22	52		II.	Tr.	Eg.
	23	38		I.	Oc.	Dis.
8	1	28		II.	Sh.	Eg.
	3	8	53.5	I.	Ec.	Re.
	20	51		I.	Tr.	In.
	22	6		I.	Sh.	In.
	23	8		I.	Tr.	Eg.
9	0	24		I.	Sh.	Eg.
	14	43		II.	Oc.	Dis.
	18	7		I.	Oc.	Dis
	19	57	55.0	II.	Ec.	Re.
	21	37	38.7	I.	Ec.	Re.
10	15	20		I.	Tr.	In.
	16	35		I.	Sh.	In.
	17	37		I.	Tr.	Eg.
	18	53		I.	Sh.	Eg.
11	3	30		III.	Oc.	Dis.
	6	32		III.*	Oc.	Re.
	8	34	19.7	III.*	Ec.	Dis.
	9	30		II.	Tr.	In.
	11	35	41.7	III.	Ec.	Re.
	12	2		II.	Sh.	In.

d	h	m	s			
11	12	12		II.	Tr.	Eg.
	12	36		I.	Oc.	Dis.
	14	46		II.	Sh.	Eg.
	16	6	23.0	I.	Ec.	Re.
12	9	50		I.	Tr.	In.
	11	4		I.	Sh.	In.
	12	7		I.	Tr.	Eg.
	13	22		I.	Sh.	Eg.
13	4	4		II.	Oc.	Dis.
	7	6		I.*	Oc.	Dis.
	9	16	30.0	II.	Ec.	Re.
	10	35	6.8	I.	Ec.	Re.
14	4	19		I.	Tr.	In.
	5	33		I.	Sh.	In.
	6	36		I.*	Tr.	Eg.
	7	51		I.*	Sh.	Eg.
	17	30		III.	Tr.	In.
	20	33		III.	Tr.	Eg.
	22	23		III.	Sh.	In.
	22	50		II.	Tr.	In.
15	1	19		II.	Sh.	In.
	1	32		II.	Tr.	Eg.
	1	34		III.	Sh.	Eg.
	1	35		I.	Oc.	Dis.
	4	3		II.	Sh.	Eg.
	5	3	52.7	I.	Ec.	Re.
	13	26		IV.	Tr.	In.
	15	45		IV.	Tr.	Eg.
	22	49		I.	Tr.	In.
16	0	2		I.	Sh.	In.
	0	27		IV.	Sh.	In.
	1	6		I.	Tr.	Eg.
	2	20		I.	Sh.	Eg.
	3	19		IV.	Sh.	Eg.
	17	26		II.	Oc.	Dis.
	20	5		I.	Oc.	Dis.
	22	36	11.0	II.	Ec.	Re.
	23	32	37.5	I.	Ec.	Re.
17	17	18		I.	Tr.	In.
	18	30		I.	Sh.	In.
	19	35		I.	Tr.	Eg.
	20	48		I.	Sh.	Eg.
18	7	42		III.*	Oc.	Dis.
	10	46		III.	Oc.	Re.
	12	11		II.	Tr.	In.
	12	34	34.1	III.	Ec.	Dis.
	14	34		I.	Oc.	Dis.
	14	37		II.	Sh.	In.
	14	53		II.	Tr.	Eg.
	15	36	56.5	III.	Ec.	Re.
	17	21		II.	Sh.	Eg.
	18	1	21.3	I.	Ec.	Re.
19	11	48		I.	Tr.	In.
	12	59		I.	Sh.	In.
	14	5		I.	Tr.	Eg.
	15	17		I.	Sh.	Eg.
20	6	48		II.*	Oc.	Dis.
	9	4		I.	Oc.	Dis.
	11	54	45.5	II.	Ec.	Re.
	12	30	4.7	I.	Ec.	Re.
21	6	18		I.*	Tr.	In.
	7	28		I.*	Sh.	In.
	8	35		I.	Tr.	Eg.
	9	46		I.	Sh.	Eg.
	21	43		III.	Tr.	In.
22	0	48		III.	Tr.	Eg.
	1	32		II.	Tr.	In.

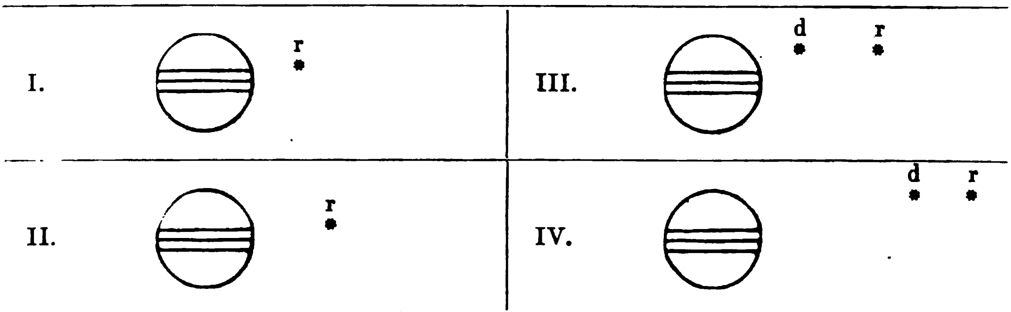
d	h	m	s			
22	2	23		III.	Sh.	In.
	3	34		I.	Oc.	Dis.
	3	54		II.	Sh.	In.
	4	14		II.	Tr.	Eg.
	5	35		III.	Sh.	Eg.
	6	39		II.*	Sh.	Eg.
	6	58	49.6	I.*	Ec.	Re.
23	0	48		I.	Tr.	In.
	1	57		I.	Sh.	In.
	3	5		I.	Tr.	Eg.
	4	15		I.	Sh.	Eg.
	20	11		II.	Oc.	Dis.
	22	3		I.	Oc.	Dis.
	22	51		IV.	Oc.	Dis.
24	1	14	26.5	II.	Ec.	Re.
	1	18		IV.	Oc.	Re.
	1	27	34.0	I.	Ec.	Re.
	9	22	19.7	IV.	Ec.	Dis.
	12	16	19.1	IV.	Ec.	Re.
	19	18		I.	Tr.	In.
	20	26		I.	Sh.	In.
	21	35		I.	Tr.	Eg.
	22	44		I.	Sh.	Eg.
25	11	57		III.	Oc.	Dis.
	14	53		II.	Tr.	In.
	15	2		III.	Oc.	Re.
	16	33		I.	Oc.	Dis.
	16	34	9.9	III.	Ec.	Dis.
	17	12		II.	Sh.	In.
	17	36		II.	Tr.	Eg.
	19	37	32.5	III.	Ec.	Re.
	19	56	17.2	I.	Ec.	Re.
	19	57		II.	Sh.	Eg.
26	13	48		I.	Tr.	In.
	14	55		I.	Sh.	In.
	16	5		I.	Tr.	Eg.
	17	13		I.	Sh.	Eg.
27	9	34		II.	Oc.	Dis.
	11	3		I.	Oc.	Dis.
	14	25	0.2	I.	Ec.	Re.
	14	33	0.0	II.	Ec.	Re.
28	8	18		I.	Tr.	In.
	9	23		I.	Sh.	In.
	10	35		I.	Tr.	Eg.
	11	41		I.	Sh.	Eg.
29	2	0		III.	Tr.	In.
	4	15		II.	Tr.	In.
	5	6		III.	Tr.	Eg.
	5	33		I.	Oc.	Dis.
	6	24		III.*	Sh.	In.
	6	29		II.*	Sh.	In.
	6	58		II.*	Tr.	Eg.
	8	53	44.3	I.	Ec.	Re.
	9	14		II.	Sh.	Eg.
	9	37		III.	Sh.	Eg.
30	2	48		I.	Tr.	In.
	3	52		I.	Sh.	In.
	5	5		I.	Tr.	Eg.
	6	10		I.*	Sh.	Eg.
	22	58		II.	Oc.	Dis.
31	0	2		I.	Oc.	Dis.
	3	22	28.3	I.	Ec.	Re.
	3	52	40.4	II.	Ec.	Re.
	21	18		I.	Tr.	In.
	22	21		I.	Sh.	In.
	23	35		I.	Tr.	Eg.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc., denotes occultation: Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

OCTOBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 7h for an Inverting Telescope.

Day.	West.		East.
1	4· 3· 2·	○	·1
2	4· ·3 ·1 ·2	○	
3	·4 ·3	○	1· ·2
4	○ 2· ·4 ·1	○	·3 ●
5	·4 ·2 1	○	· ·3
6	·4	○	·2 3· ·1 ●
7	1·	○	·4 3· 2·
8	3· 2·	○	·1 ·4
9	3· 1· ·2	○	·4
10	·3	○	1· ·2 ·4
11	·1	○	3 2· ·4
12	2·	○	1· ·3 4·
13		○	3· 4· ·2 ● ·1 ●
14	1·	○	3· · 2· 4·
15	3· 2·	○	4· ·1
16	3· ·3 4· 1·	○	
17	4· ·3	○	·1 ·2
18	4· ·1 ·	○	3 2·
19	4· 2·	○	1· ·3
20	·4 ·1	○	3· ·2 ●
21	○ 1· ·4	○	3· 2·
22	·4 3· 2·	○	·1
23	3· ·2 ·4 1·	○	
24	·3	○	·4 ·1 ·2
25	·1 ·3	○	2· ·4
26	2·	○	1· ·3 ·4
27	·1 ·2	○	·3 ·4
28		○	1· ·2 3· 4·
29	3· 2·	○	4· ·1 ●
30	3· ·2 1·	○	4·
31	·3	○	·2 ·1 4·

WASHINGTON MEAN TIME.

NOVEMBER.

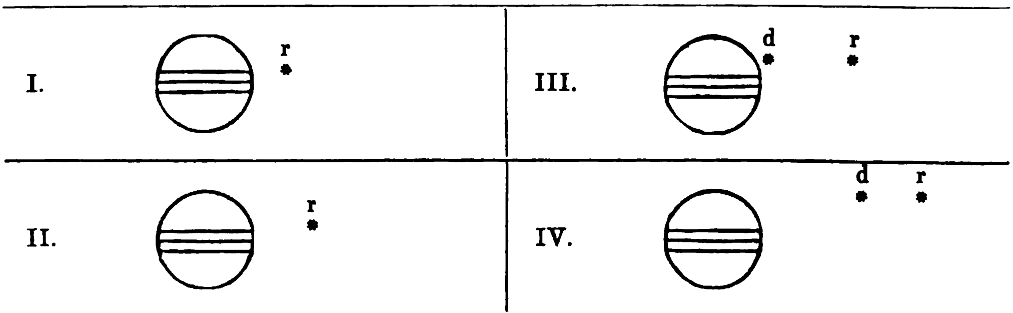
d	h	m	s			
1	0	39		I.	Sh.	Eg.
	8	53		IV.	Tr.	In.
	11	26		IV.	Tr.	Eg.
	16	14		III.	Oc.	Dis.
	17	37		II.	Tr.	In.
	18	31		IV.	Sh.	In.
	18	32		I.	Oc.	Dis.
	19	21		III.	Oc.	Re.
	19	47		II.	Sh.	In.
	20	20		II.	Tr.	Eg.
	20	33	36.3	III.	Ec.	Dis.
	21	34		IV.	Sh.	Eg.
	21	51	10.7	I.	Ec.	Re.
	22	32		II.	Sh.	Eg.
	23	37	58.3	III.	Ec.	Re.
2	15	48		I.	Tr.	In.
	16	50		I.	Sh.	In.
	18	5		I.	Tr.	Eg.
	19	8		I.	Sh.	Eg.
3	12	21		II.	Oc.	Dis.
	13	2		I.	Oc.	Dis.
	16	19	53.0	I.	Ec.	Re.
	17	11	12.4	II.	Ec.	Re.
4	10	18		I.	Tr.	In.
	11	19		I.	Sh.	In.
	12	35		I.	Tr.	Eg.
	13	37		I.	Sh.	Eg.
5	6	20		III.*	Tr.	In.
	6	59		II.*	Tr.	In.
	7	32		I.	Oc.	Dis.
	9	4		II.	Sh.	In.
	9	27		III.	Tr.	Eg.
	9	42		II.	Tr.	Eg.
	10	24		III.	Sh.	In.
	10	48	36.3	I.	Ec.	Re.
	11	49		II.	Sh.	Eg.
	13	38		III.	Sh.	Eg.
6	4	48		I.	Tr.	In.
	5	48		I.	Sh.	In.
	7	5		I.*	Tr.	Eg.
	8	6		I.	Sh.	Eg.
7	1	46		II.	Oc.	Dis.
	2	2		I.	Oc.	Dis.
	5	17	20.0	I.	Ec.	Re.
	6	30	50.9	II.*	Ec.	Re.
	23	18		I.	Tr.	In.
8	0	16		I.	Sh.	In.
	1	35		I.	Tr.	Eg.
	2	34		I.	Sh.	Eg.
	20	22		II.	Tr.	In.
	20	32		I.	Oc.	Dis.
	20	34		III.	Oc.	Dis.
	22	22		II.	Sh.	In.
	23	5		II.	Tr.	Eg.
	23	41		III.	Oc.	Re.
	23	46	1.4	I.	Ec.	Re.
9	0	32	58.7	III.	Ec.	Dis.
	1	7		II.	Sh.	Eg.
	3	38	19.1	III.	Ec.	Re.
	17	48		I.	Tr.	In.
	18	34		IV.	Oc.	Dis.
	18	45		I.	Sh.	In.
	20	5		I.	Tr.	Eg.
	21	3		I.	Sh.	Eg.
	21	14		IV.	Oc.	Re.
10	3	23	59.6	IV.	Ec.	Dis.
	6	27	46.4	IV.*	Ec.	Re.
	15	2		I.	Oc.	Dis.
10	15	10		II.	Oc.	Dis.
	18	14	43.4	I.	Ec.	Re.
	19	49	21.1	II.	Ec.	Re.
11	12	18		I.	Tr.	In.
	13	14		I.	Sh.	In.
	14	36		I.	Tr.	Eg.
	15	32		I.	Sh.	Eg.
12	9	32		I.	Oc.	Dis.
	9	45		II.	Tr.	In.
	10	41		III.	Tr.	In.
	11	39		II.	Sh.	In.
	12	28		II.	Tr.	Eg.
	12	43	25.7	I.	Ec.	Re.
	13	50		III.	Tr.	Eg.
	14	24		II.	Sh.	Eg.
	14	25		III.	Sh.	In.
	17	40		III.	Sh.	Eg.
13	6	48		I.*	Tr.	In.
	7	43		I.	Sh.	In.
	9	6		I.	Tr.	Eg.
	10	1		I.	Sh.	Eg.
14	4	2		I.	Oc.	Dis.
	4	35		II.	Oc.	Dis.
	7	12	8.6	I.	Ec.	Re.
	9	8	56.3	II.	Ec.	Re.
15	1	18		I.	Tr.	In.
	2	12		I.	Sh.	In.
	3	36		I.	Tr.	Eg.
	4	30		I.	Sh.	Eg.
	22	32		I.	Oc.	Dis.
	23	8		II.	Tr.	In.
16	0	56		III.	Oc.	Dis.
	0	57		II.	Sh.	In.
	1	40	49.3	I.	Ec.	Re.
	1	51		II.	Tr.	Eg.
	3	42		II.	Sh.	Eg.
	4	5		III.	Oc.	Re.
	4	32	26.9	III.	Ec.	Dis.
	7	38	45.1	III.	Ec.	Re.
	19	49		I.	Tr.	In.
	20	41		I.	Sh.	In.
	22	7		I.	Tr.	Eg.
	22	59		I.	Sh.	Eg.
17	17	2		I.	Oc.	Dis.
	17	59		II.	Oc.	Dis.
	20	9	30.4	I.	Ec.	Re.
	22	27	24.2	II.	Ec.	Re.
18	4	50		IV.	Tr.	In.
	7	38		IV.	Tr.	Eg.
	12	35		IV.	Sh.	In.
	14	19		I.	Tr.	In.
	15	9		I.	Sh.	In.
	15	48		IV.	Sh.	Eg.
	16	37		I.	Tr.	Eg.
	17	27		I.	Sh.	Eg.
19	11	32		I.	Oc.	Dis.
	12	32		II.	Tr.	In.
	14	14		II.	Sh.	In.
	14	38	11.7	I.	Ec.	Re.
	15	5		III.	Tr.	In.
	15	15		II.	Tr.	Eg.
	16	59		II.	Sh.	Eg.
	18	15		III.	Tr.	Eg.
	18	25		III.	Sh.	In.
	21	41		III.	Sh.	Eg.
20	8	49		I.	Tr.	In.
	9	38		I.	Sh.	In.
20	11	7		I.	Tr.	Eg.
	11	56		I.	Sh.	Eg.
21	6	3		I.*	Oc.	Dis.
	7	24		II.	Oc.	Dis.
	9	6	54.1	I.	Ec.	Re.
	11	46	55.5	II.	Ec.	Re.
22	3	20		I.	Tr.	In.
	4	7		I.	Sh.	In.
	5	38		I.*	Tr.	Eg.
	6	25		I.*	Sh.	Eg.
23	0	33		I.	Oc.	Dis.
	1	55		II.	Tr.	In.
	3	31		II.	Sh.	In.
	3	35	33.9	I.	Ec.	Re.
	4	39		II.	Tr.	Eg.
	5	20		III.	Oc.	Dis.
	6	17		II.*	Sh.	Eg.
	8	31		III.	Oc.	Re.
	8	32	29.1	III.	Ec.	Dis.
	11	39	44.9	III.	Ec.	Re.
	21	50		I.	Tr.	In.
	22	36		I.	Sh.	In.
24	0	8		I.	Tr.	Eg.
	0	54		I.	Sh.	Eg.
	19	3		I.	Oc.	Dis.
	20	49		II.	Oc.	Dis.
	22	4	14.2	I.	Ec.	Re.
25	1	5	20.9	II.	Ec.	Re.
	16	20		I.	Tr.	In.
	17	5		I.	Sh.	In.
	18	38		I.	Tr.	Eg.
	19	23		I.	Sh.	Eg.
26	13	33		I.	Oc.	Dis.
	14	42		IV.	Oc.	Dis.
	15	19		II.	Tr.	In.
	16	32	54.8	I.	Ec.	Re.
	16	48		II.	Sh.	In.
	17	38		IV.	Oc.	Re.
	18	3		II.	Tr.	Eg.
	19	30		III.	Tr.	In.
	19	34		II.	Sh.	Eg.
	21	25	11.1	IV.	Ec.	Dis.
	22	25		III.	Sh.	In.
	22	41		III.	Tr.	Eg.
27	0	38	3.3	IV.	Ec.	Re.
	1	42		III.	Sh.	Eg.
	10	51		I.	Tr.	In.
	11	34		I.	Sh.	In.
	13	9		I.	Tr.	Eg.
	13	52		I.	Sh.	Eg.
28	8	3		I.	Oc.	Dis.
	10	15		II.	Oc.	Dis.
	11	1	36.7	I.	Ec.	Re.
	14	24	48.1	II.	Ec.	Re.
29	5	21		I.	Tr.	In.
	6	2		I.*	Sh.	In.
	7	39		I.	Tr.	Eg.
	8	20		I.	Sh.	Eg.
30	2	34		I.	Oc.	Dis.
	4	43		II.	Tr.	In.
	5	30	15.7	I.*	Ec.	Re.
	6	6		II.*	Sh.	In.
	7	27		II.	Tr.	Eg.
	8	52		II.	Sh.	Eg.
	9	46		III.	Oc.	Dis.
	15	40	20.3	III.	Ec.	Re.
	23	52		I.	Tr.	In.

**NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.**

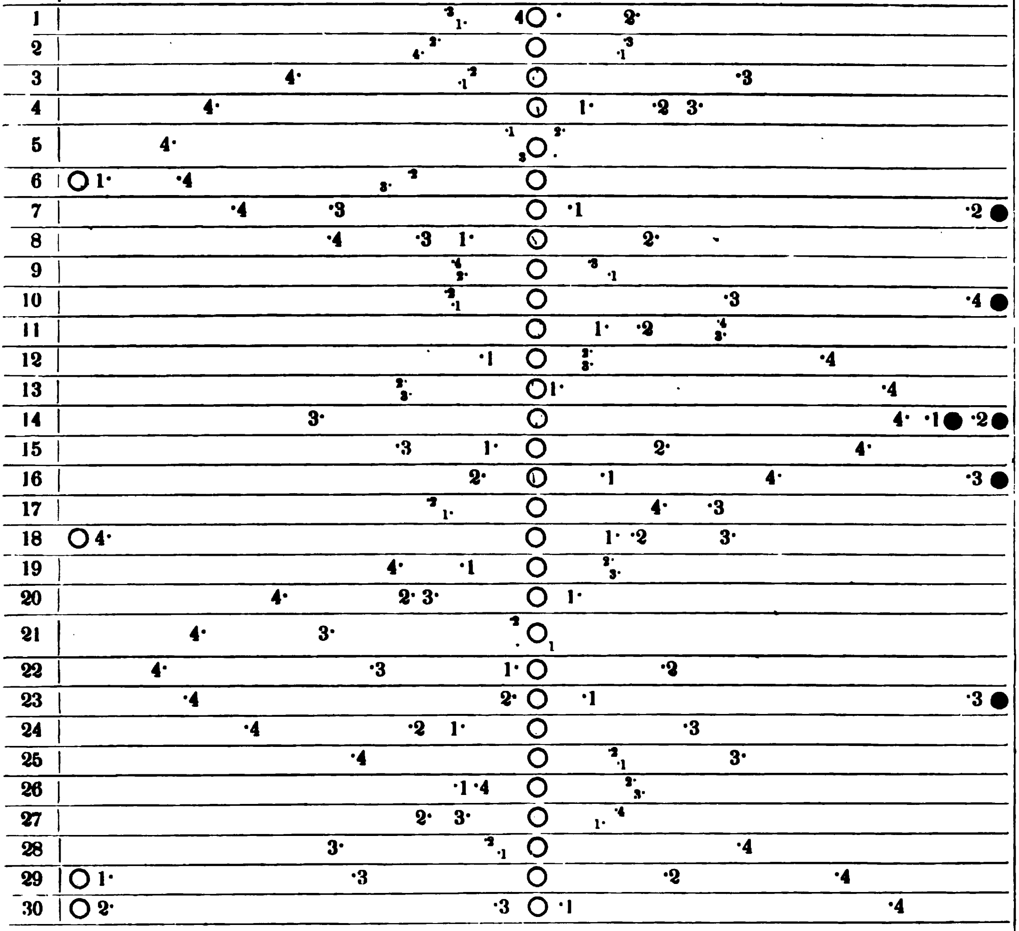
WASHINGTON MEAN TIME.

NOVEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 6h for an Inverting Telescope.



Day.	West.		East.
1	·3 1· 4	○	· 2·
2	4· 2·	○	·1 3
3	4· ·1 2	○	·3
4	4·	○	1· ·2 3·
5	4· ·1 3	○	2· ·
6	○ 1· ·4 3· 2	○	
7	·4 ·3	○	·1 ·2 ●
8	·4 ·3 1·	○	2·
9	·4 2·	○	·3 ·1
10	·2 ·1	○	·3 ·4 ●
11		○	1· ·2 ·4 3·
12	·1	○	2· 3· ·4
13	2· 3·	○	1· ·4
14	3·	○	4· ·1 ● ·2 ●
15	·3 1·	○	2· 4·
16	2·	○	·1 4· ·3 ●
17	·2 1·	○	4· ·3
18	○ 4·	○	1· ·2 3·
19	4· ·1	○	2· 3·
20	4· 2· 3·	○	1·
21	4· 3· ·2 ·	○	1
22	4· ·3 1·	○	·2
23	·4 2·	○	·1 ·3 ●
24	·4 ·2 1·	○	·3
25	·4	○	·2 ·1 3·
26	·1 ·4	○	2· 3·
27	2· 3·	○	1· ·4
28	3· ·2 ·1	○	·4
29	○ 1· ·3	○	·2 ·4
30	○ 2· ·3	○	·1 ·4

WASHINGTON MEAN TIME.

DECEMBER.

d	h	m	s			
1	0	31		I.	Sh.	In.
	2	10		I.	Tr.	Eg.
	2	49		I.	Sh.	Eg.
	21	4		I.	Oc.	Dis.
	23	40		II.	Oc.	Dis.
	23	58	55.4	I.	Ec.	Re.
2	3	43	9.9	II.	Ec.	Re.
	18	22		I.	Tr.	In.
	19	0		I.	Sh.	In.
	20	40		I.	Tr.	Eg.
	21	18		I.	Sh.	Eg.
3	15	34		I.	Oc.	Dis.
	18	7		II.	Tr.	In.
	18	27	34.6	I.	Ec.	Re.
	19	23		II.	Sh.	In.
	20	51		II.	Tr.	Eg.
	22	9		II.	Sh.	Eg.
	23	56		III.	Tr.	In.
4	2	24		III.	Sh.	In.
	3	9		III.	Tr.	Eg.
	5	42		III. *	Sh.	Eg.
	12	53		I.	Tr.	In.
	13	29		I.	Sh.	In.
	15	11		I.	Tr.	Eg.
	15	47		I.	Sh.	Eg.
5	1	12		IV.	Tr.	In.
	4	15		IV.	Tr.	Eg.
	6	39		IV.	Sh.	In.
	10	1		IV.	Sh.	Eg.
	10	5		I.	Oc.	Dis.
	12	56	15.9	I.	Ec.	Re.
	13	6		II.	Oc.	Dis.
	17	2	31.7	II.	Ec.	Re.
6	7	23		I.	Tr.	In.
6	7	58		I.	Sh.	In.
	9	41		I.	Tr.	Eg.
	10	16		I.	Sh.	Eg.
7	4	35		I.	Oc.	Dis.
	7	24	53.9	I.	Ec.	Re.
	7	31		II.	Tr.	In.
	8	41		II.	Sh.	In.
	10	16		II.	Tr.	Eg.
	11	27		II.	Sh.	Eg.
	14	13		III.	Oc.	Dis.
	19	41	13.6	III.	Ec.	Re.
8	1	54		I.	Tr.	In.
	2	27		I.	Sh.	In.
	4	12		I.	Tr.	Eg.
	4	45		I.	Sh.	Eg.
	23	5		I.	Oc.	Dis.
9	1	53	32.9	I.	Ec.	Re.
	2	31		II.	Oc.	Dis.
	6	20	50.3	II.	Ec.	Re.
	20	24		I.	Tr.	In.
	20	55		I.	Sh.	In.
	22	42		I.	Tr.	Eg.
	23	13		I.	Sh.	Eg.
10	17	36		I.	Oc.	Dis.
	20	22	11.0	I.	Ec.	Re.
	20	56		II.	Tr.	In.
	21	58		II.	Sh.	In.
	23	41		II.	Tr.	Eg.
11	0	44		II.	Sh.	Eg.
	4	24		III.	Tr.	In.
	6	24		III.	Sh.	In.
	7	38		III.	Tr.	Eg.
	9	43		III.	Sh.	Eg.
	14	55		I.	Tr.	In.
11	15	24		I.	Sh.	In.
	17	13		I.	Tr.	Eg.
	17	42		I.	Sh.	Eg.
12	12	6		I.	Oc.	Dis.
	14	50	51.4	I.	Ec.	Re.
	15	57		II.	Oc.	Dis.
	19	40	6.1	II.	Ec.	Re.
13	9	25		I.	Tr.	In.
	9	53		I.	Sh.	In.
	11	10		IV.	Oc.	Dis.
	11	43		I.	Tr.	Eg.
	12	11		I.	Sh.	Eg.
	14	21		IV.	Oc.	Re.
	15	25	26.1	IV.	Ec.	Dis.
	18	47	49.3	IV.	Ec.	Re.
14	6	37		I.	Oc.	Dis.
	9	19	28.5	I.	Ec.	Re.
	10	20		II.	Tr.	In.
	11	16		II.	Sh.	In.
	13	6		II.	Tr.	Eg.
	14	2		II.	Sh.	Eg.
	18	41		III.	Oc.	Dis.
	23	41	26.4	III.	Ec.	Re.
15	3	56		I.	Tr.	In.
	4	21		I.	Sh.	In.
	6	14		I.	Tr.	Eg.
	6	40		I.	Sh.	Eg.
16	1	7		I.	Oc.	Dis.
	3	48	6.8	I.	Ec.	Re.
	5	23		II.	Oc.	Dis.
	8	58	20.9	II.	Ec.	Re.
	22	26		I.	Tr.	In.
	22	50		I.	Sh.	In.

The Satellites are not visible from December 17 to the end of the year, Jupiter being too near the Sun.

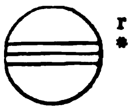
NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

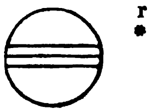
DECEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

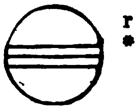
I.



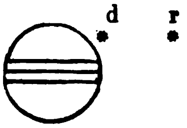
III.



II.



IV.



Configurations at 5h for an Inverting Telescope.

Day.	West.		East.
1	·2 1·	○	·3 4·
2		○	·2 ·1 ·3 4·
3	1·	○	2· 3· 4·
4	2· 3·	○	1· 4·
5	3· ·2 ·1 4·	○	
6	·3 4·	○	1· ·2
7	4· ·3	○	2· ·1 ●
8	4· 2· 1·	○	·3
9	4·	○	·1 ·3 ·2 ●
10	·4 1·	○	2· 3·
11	○ 3· ·4 2·	○	·1
12	·4 3· ·2 ·1	○	
13	·3 ·4	○	1· ·2
14	·3 ·1	○	2· ·4
15	○ 1· 2·	○	·3 ·4
16	·	○	2 ·1 ·3 ·4

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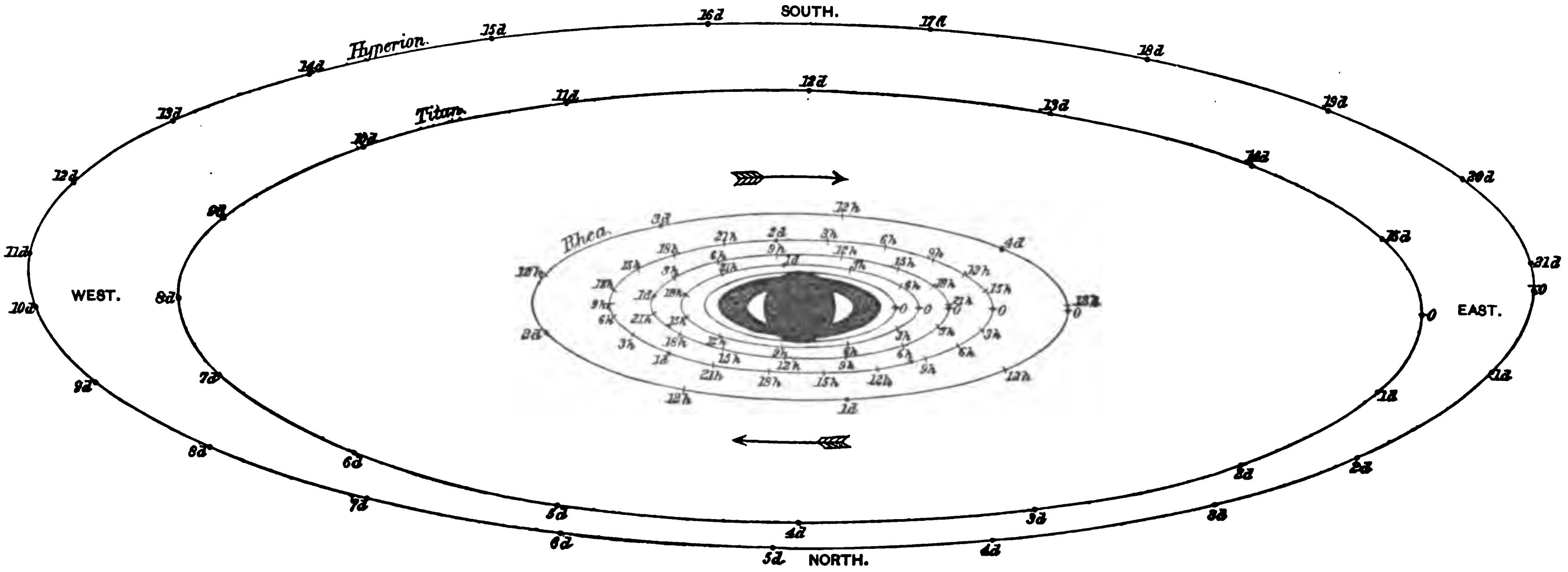


APPARENT ORBITS OF THE SEVEN INNER SATELLITES OF SATURN,

AT OPPOSITION IN 1888 *AND* 1889,

AS SEEN IN AN INVERTING TELESCOPE

NAMES OF THE SATELLITES.	
I.	Mimas.
II.	Enceladus.
III.	Tethys.
IV.	Dione.
V.	Rhea.
VI.	Titan.
VII.	Hyperion
VIII.	Japetus.

MEAN SYNODIC PERIODS.	d	h
I.	0	22.6
II.	1	8.9
III.	1	21.3
IV.	2	17.7
V.	4	12.5
VI.	15	23.3
VII.	21	7.8
VIII.	79	22.0

WASHINGTON MEAN TIMES OF GREATEST ELONGATION, ETC.

In the diagram on the preceding page, the points of the orbits marked "o" are those of the eastern elongation, as seen in an inverting telescope. The apparent positions of a satellite at any time may be marked on the diagram by counting around the orbit the interval in days and hours which has elapsed since the last east elongation. The times of these elongations may be found from the following tables. Mimas can be seen only within a few hours of each elongation: the time of every elongation visible at Washington is therefore given. The times of other elongations of any satellite in the same direction may be found by adding or subtracting any multiple of the period. For the three outer satellites the times of elongation and conjunction are given. The following abbreviations are used:—

E., East Elongation,
I., Inferior Conjunction (north of planet),
W., West Elongation,
S., Superior Conjunction (south of planet).

MIMAS.

Greatest Elongations Visible at Washington.

	d	h			d	h			d	h			d	h			d	h			d	h	
Jan.	3	16.2	E.	Feb.	2	8.4	W.	Mar.	6	9.2	W.	Apr.	7	10.1	W.	Oct.	26	15.3	E.	Dec.	1	10.9	E.
	4	14.8	E.		7	12.8	E.		7	7.9	W.		8	8.7	W.		27	13.9	E.		6	15.4	W.
	5	13.5	E.		8	11.4	E.		11	13.6	E.		9	7.4	W.		28	12.5	E.		7	14.0	W.
	6	12.1	E.		9	10.0	E.		12	12.3	E.		14	11.8	E.	Nov.	3	15.6	W.		8	12.6	W.
	7	10.7	E.		10	8.6	E.		13	10.9	E.		15	10.4	E.		4	14.2	W.		9	11.2	W.
	12	15.1	W.		11	7.2	E.		14	9.5	E.		16	8.9	E.		5	12.9	W.		10	9.9	W.
	13	13.7	W.		15	13.0	W.		15	8.1	E.		17	7.5	E.		6	11.5	W.		13	17.0	E.
	14	12.3	W.		16	11.6	W.		19	13.8	W.		22	12.0	W.		11	16.0	E.		14	15.6	E.
	15	10.9	W.		17	10.2	W.		20	12.4	W.		23	10.7	W.		12	14.6	E.		15	14.2	E.
	16	9.5	W.		18	8.8	W.		21	11.1	W.		24	9.3	W.		13	13.2	E.		16	12.8	E.
	20	15.2	E.		19	7.4	W.		22	9.7	W.		25	7.9	W.		14	11.8	E.		17	11.4	E.
	21	13.8	E.		23	13.3	E.		23	8.3	W.	May	1	10.9	E.		19	16.1	W.		21	17.2	W.
	22	12.4	E.		24	11.9	E.		28	12.6	E.		2	9.5	E.		20	14.7	W.		22	15.8	W.
	23	11.0	E.		25	10.5	E.		29	11.2	E.		3	8.2	E.		21	13.4	W.		23	14.4	W.
	24	9.7	E.		26	9.1	E.		30	9.8	E.		10	9.8	W.		22	12.0	W.		24	13.0	W.
	29	14.0	W.		27	7.6	E.		31	8.5	E.		11	8.4	W.		27	16.5	E.		25	11.7	W.
	30	12.6	W.	Mar.	3	13.4	W.	Apr.	1	7.1	E.		12	7.1	W.		28	15.1	E.		30	16.1	E.
	31	11.2	W.		4	12.0	W.		5	12.9	W.		18	10.1	E.		29	13.7	E.		31	14.7	E.
Feb.	1	9.8	W.		5	10.6	W.		6	11.5	W.		19	8.7	E.		30	12.3	E.		32	13.3	E.

ENCELADUS.

	d	h			d	h			d	h			d	h			d	h			d	h	
Jan.	2	6.4	E.	Jan.	15	23.3	E.	Jan.	29	15.9	E.	Feb.	12	8.6	E.	Feb.	26	1.4	E.	Mar.	11	18.1	E.
	3	15.3	E.		17	8.2	E.		31	0.8	E.		13	17.5	E.		27	10.3	E.		13	3.0	E.
	5	0.2	E.		18	17.1	E.	Feb.	1	9.7	E.		15	2.4	E.		28	19.2	E.		14	11.9	E.
	6	9.1	E.		20	1.9	E.		2	18.5	E.		16	11.3	E.	Mar.	2	4.0	E.		15	20.8	E.
	7	18.0	E.		21	10.7	E.		4	3.4	E.		17	20.2	E.		3	12.9	E.		17	5.7	E.
	9	2.9	E.		22	19.6	E.		5	12.2	E.		19	5.0	E.		4	21.7	E.		18	14.5	E.
	10	11.8	E.		24	4.5	E.		6	21.1	E.		20	13.9	E.		6	6.6	E.		19	23.4	E.
	11	20.7	E.		25	13.3	E.		8	6.0	E.		21	22.8	E.		7	15.5	E.		21	8.2	E.
	13	5.5	E.		26	22.2	E.		9	14.8	E.		23	7.6	E.		9	0.3	E.		22	17.1	E.
	14	14.4	E.		28	7.1	E.		10	23.7	E.		24	16.5	E.		10	9.2	E.		24	2.0	E.

WASHINGTON MEAN TIMES OF GREATEST ELONGATIONS.

ENCELADUS—(*Concluded.*)

	d	h		d	h		d	h		d	h		d	h		d	h
Mar.	25	10.9 E.	Apr.	15	0.2 E.	May	5	13.6 E.	Nov.	1	3.4 E.	Nov.	21	16.9 E.	Dec.	12	6.1 E.
	26	19.8 E.		16	9.1 E.		6	22.5 E.		2	12.3 E.		23	1.7 E.		13	15.0 E.
	28	4.7 E.		17	18.0 E.		8	7.4 E.		3	21.3 E.		24	10.5 E.		14	23.9 E.
	29	13.5 E.		19	2.9 E.		9	16.2 E.		5	6.2 E.		25	19.4 E.		16	8.8 E.
	30	22.4 E.		20	11.8 E.		11	1.1 E.		6	15.1 E.		27	4.3 E.		17	17.7 E.
Apr.	1	7.3 E.		21	20.7 E.		12	10.0 E.		8	0.0 E.		28	13.2 E.		19	2.6 E.
	2	16.2 E.		23	5.6 E.		13	18.9 E.		9	8.9 E.		29	22.1 E.		20	11.5 E.
	4	1.1 E.		24	14.5 E.		15	3.8 E.		10	17.8 E.	Dec.	1	7.0 E.		21	20.3 E.
	5	9.9 E.		25	23.4 E.		16	12.7 E.		12	2.7 E.		2	15.9 E.		23	5.2 E.
	6	18.8 E.		27	8.3 E.		17	21.6 E.		13	11.6 E.		4	0.8 E.		24	14.1 E.
	8	3.7 E.		28	17.2 E.	Oct.	25	7.0 E.		14	20.5 E.		5	9.7 E.		25	23.0 E.
	9	12.6 E.		30	2.1 E.		26	15.9 E.		16	5.4 E.		6	18.6 E.		27	7.9 E.
	10	21.5 E.	May	1	11.0 E.		28	0.7 E.		17	14.2 E.		8	3.4 E.		28	16.7 E.
	12	6.4 E.		2	19.8 E.		29	9.6 E.		18	23.1 E.		9	12.3 E.		30	1.6 E.
	13	15.3 E.		4	4.7 E.		30	18.5 E.		20	8.0 E.		10	21.2 E.		31	10.5 E.

TETHYS.

	d	h		d	h		d	h		d	h		d	h		d	h
Jan.	2	17.0 E.	Feb.	9	10.7 E.	Mar.	19	4.4 E.	Apr.	25	22.4 E.	Oct.	18	14.7 E.	Nov.	25	9.1 E.
	4	14.3 E.		11	8.0 E.		21	1.7 E.		27	19.7 E.		20	12.0 E.		27	6.4 E.
	6	11.6 E.		13	5.2 E.		22	23.0 E.		29	17.1 E.		22	9.3 E.		29	3.7 E.
	8	8.9 E.		15	2.5 E.		24	20.3 E.	May	1	14.4 E.		24	6.6 E.	Dec.	1	1.0 E.
	10	6.2 E.		16	23.8 E.		26	17.6 E.		3	11.7 E.		26	3.9 E.		2	22.3 E.
	12	3.5 E.		18	21.1 E.		28	14.9 E.		5	9.0 E.		28	1.3 E.		4	19.6 E.
	14	0.8 E.		20	18.4 E.		30	12.2 E.		7	6.4 E.		29	22.6 E.		6	16.9 E.
	15	22.1 E.		22	15.7 E.	Apr.	1	9.5 E.		9	3.7 E.		31	19.9 E.		8	14.2 E.
	17	19.4 E.		24	13.0 E.		3	6.8 E.		11	1.0 E.	Nov.	2	17.2 E.		10	11.5 E.
	19	16.7 E.		26	10.3 E.		5	4.1 E.		12	22.3 E.		4	14.5 E.		12	8.8 E.
	21	14.0 E.		28	7.5 E.		7	1.4 E.		14	19.7 E.		6	11.8 E.		14	6.1 E.
	23	11.2 E.	Mar.	2	4.8 E.		8	22.7 E.		16	17.0 E.		8	9.1 E.		16	3.4 E.
	25	8.5 E.		4	2.1 E.		10	20.0 E.		18	14.3 E.		10	6.5 E.		18	0.7 E.
	27	5.8 E.		5	23.4 E.		12	17.3 E.		20	11.6 E.		12	3.9 E.		19	22.1 E.
	29	3.0 E.		7	20.7 E.		14	14.7 E.		22	8.9 E.		14	1.2 E.		21	19.4 E.
	31	0.3 E.		9	18.0 E.		16	12.0 E.		24	6.2 E.		15	22.5 E.		23	16.7 E.
Feb.	1	21.6 E.		11	15.3 E.		18	9.3 E.		26	3.5 E.		17	19.8 E.		25	14.0 E.
	3	18.9 E.		13	12.6 E.		20	6.6 E.		28	0.9 E.		19	17.2 E.		27	11.2 E.
	5	16.1 E.		15	9.8 E.		22	3.8 E.		29	22.3 E.		21	14.5 E.		29	8.5 E.
	7	13.4 E.		17	7.1 E.		24	1.1 E.		31	19.6 E.		23	11.8 E.		31	5.8 E.

DIONE.

	d	h		d	h		d	h		d	h		d	h		d	h
Jan.	2	2.2 E.	Feb.	3	21.6 E.	Mar.	8	17.3 E.	Apr.	10	13.2 E.	Oct.	27	12.2 E.	Nov.	29	8.8 E.
	4	19.8 E.		6	15.3 E.		11	11.0 E.		13	6.9 E.		30	6.0 E.	Dec.	2	2.5 E.
	7	13.4 E.		9	8.9 E.		14	4.6 E.		16	0.6 E.	Nov.	1	23.7 E.		4	20.2 E.
	10	7.0 E.		12	2.5 E.		16	22.3 E.		18	18.3 E.		4	17.5 E.		7	13.9 E.
	13	0.6 E.		14	20.1 E.		19	15.9 E.		21	12.0 E.		7	11.2 E.		10	7.6 E.
	15	18.3 E.		17	13.8 E.		22	9.6 E.		24	5.7 E.		10	4.9 E.		13	1.2 E.
	18	11.9 E.		20	7.4 E.		25	3.2 E.		26	23.4 E.		12	22.6 E.		15	18.9 E.
	21	5.5 E.		23	1.1 E.		27	20.9 E.		29	17.1 E.		15	16.3 E.		18	12.6 E.
	23	23.1 E.		25	18.7 E.		30	14.5 E.	May	2	10.8 E.		18	10.0 E.		21	6.3 E.
	26	16.8 E.		28	12.4 E.	Apr.	2	8.2 E.		5	4.5 E.		21	3.7 E.		23	23.9 E.
	29	10.4 E.	Mar.	3	6.0 E.		5	1.8 E.		7	22.2 E.		23	21.4 E.		26	17.6 E.
Feb.	1	4.0 E.		5	23.7 E.		7	19.5 E.		10	15.9 E.		26	15.1 E.		29	11.2 E.

RHEA.						TITAN.						HYPERION.					
	d	h		d	h		d	h		d	h		d	h		d	h
Jan.	2	10.1 E.	Apr.	20	17.7 E.	Jan.	1	0 I.	Apr.	6	7 I.	Jan.	4	12 I.	May	11	17 I.
	6	22.5 E.		25	6.1 E.		5	0 W.		10	7 W.		9	20 W.		17	1 W.
	11	10.8 E.		29	18.6 E.		8	23 S.		14	7 S.		15	3 S.		22	10 S.
	15	23.1 E.	May	4	7.0 E.		12	22 E.		18	7 E.		20	10 E.		27	18 E.
	20	11.4 E.		8	19.5 E.		16	21 I.		22	6 I.		25	17 I.	June	2	2 I.
	24	23.7 E.		13	8.0 E.		20	20 W.		26	6 W.		31	0 W.	Oct.	7	23 I.
	29	11.9 E.		17	20.5 E.		24	19 S.		30	6 S.	Feb.	5	7 S.		13	6 W.
Feb.	3	0.2 E.		22	9.0 E.		28	19 E.	May	4	6 E.		10	13 E.		18	14 S.
	7	12.5 E.		26	21.6 E.	Feb.	1	18 I.		8	6 I.		15	20 I.		23	22 E.
	12	0.7 E.		31	10.1 E.		5	17 W.		12	5 W.		21	3 W.		29	6 I.
	16	13.0 E.	Nov.	1	6.4 E.		9	17 S.	Nov.	8	14 S.		26	9 S.	Nov.	3	14 W.
	21	1.3 E.		5	19.0 E.		13	16 E.		12	13 E.	Mar.	3	16 E.		8	22 S.
	25	13.5 E.		10	7.5 E.		17	15 I.		16	13 I.		8	23 I.		14	6 E.
Mar.	2	1.8 E.		14	20.0 E.		21	14 W.		20	13 W.		14	6 W.		19	14 I.
	6	14.1 E.		19	8.5 E.		25	13 S.		24	13 S.		19	14 S.		24	22 W.
	11	2.4 E.		23	20.9 E.	Mar.	1	13 E.		28	13 E.		24	21 E.		30	6 S.
	15	14.8 E.		28	9.4 E.		5	12 I.	Dec.	2	13 I.		30	4 I.	Dec.	5	14 E.
	20	3.1 E.	Dec.	2	21.9 E.		9	11 W.		6	12 W.	Apr.	4	11 W.		10	22 I.
	24	15.4 E.		7	10.3 E.		13	11 S.		10	12 S.		9	19 S.		16	6 W.
	29	3.7 E.		11	22.6 E.		17	10 E.		14	11 E.		15	3 E.		21	13 S.
Apr.	2	16.1 E.		16	10.9 E.		21	9 I.		18	11 I.		20	10 I.		26	21 E.
	7	4.5 E.		20	23.2 E.		25	8 W.		22	11 W.		25	17 W.			
	11	16.9 E.		25	11.6 E.		29	8 S.		26	11 S.	May	1	1 S.	1890		
	16	5.3 E.		30	0.0 E.	Apr.	2	7 E.		30	10 E.		6	9 E.	Jan.	1	5 I.

JAPETUS	*East Elongation* . .	January 9	March 27	June 15	September 5	November 25
	Inferior Conjunction .	January 29	April 16	July 5	September 25	December 15
	West Elongation . .	February 17	May 6	July 26	October 16	
	Superior Conjunction .	March 8	May 26	August 16	November 5	

THE APPARENT ELEMENTS OF SATURN'S RINGS.

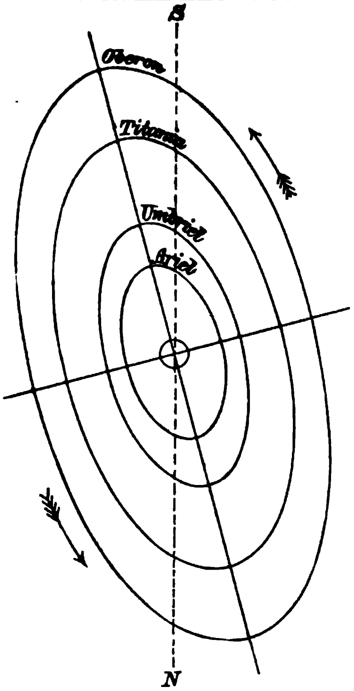
Greenwich Mean Noon.	*a* Outer Major Axis.	*b* Outer Minor Axis.	*p* Inclination of Northern Semi-Minor Axis to Circle of Declination from North to East.	*l* The Elevation of the Earth above the Plane of the Ring.	*l′* The Elevation of the Sun above the Plane of the Ring.	*u* Earth's Longitude from Saturn counted on Plane of Ring from the Ring's Ascending Node on Equator.	*u′* Ecliptic.
Jan. 0	44″.81	10″.83	− 6° 57′.3	− 13° 59′.4	− 15° 32′.7	197° 25′.2	154° 51′.6
20	45.65	11.51	7 1.0	14 35.8	15 16.2	196 12.8	153 39.3
Feb. 9	45.86	12.10	7 5.2	15 18.2	14 59.7	194 43.5	152 10.1
Mar. 1	45.37	12.47	7 8.9	15 57.4	14 43.0	193 17.4	150 44.1
21	44.31	12.53	7 11.5	16 25.2	14 26.1	192 13.4	149 40.1
Apr. 10	42.90	12.27	− 7 12.6	− 16 37.0	− 14 9.3	191 44.6	149 11.4
30	41.37	11.76	7 12.1	16 31.1	13 52.3	191 56.3	149 23.2
May 20	39.92	11.10	7 10.0	16 8.3	13 35.2	192 47.3	150 14.3
June 9	38.67	10.34	7 6.4	15 30.8	13 18.0	194 11.9	151 39.0
29	37.71	9.56	7 1.4	14 41.3	13 0.8	196 2.6	153 29.8
July 19	37.05	8.79	− 6 55.0	− 13 42.9	− 12 43.4	198 11.1	155 38.3
Aug. 8	36.74	8.05	6 47.5	12 39.0	12 26.0	200 29.6	157 56.9
28	36.77	7.36	6 39.4	11 33.0	12 8.5	202 50.3	160 17.7
Sept. 17	37.15	6.76	6 31.1	10 28.9	11 50.9	205 5.6	162 33.1
Oct. 7	37.87	6.26	6 23.2	9 31.0	11 33.2	207 8.0	164 35.6
27	38.90	5.90	− 6 16.3	− 8 43.6	− 11 15.4	208 49.3	166 17.0
Nov. 16	40.21	5.72	6 11.2	8 10.9	10 57.7	210 2.1	167 29.8
Dec. 6	41.68	5.77	6 8.6	7 57.0	10 39.8	210 39.4	168 7.2
26	43.16	6.05	6 8.9	8 3.4	10 21.9	210 37.4	168 5.3
31	43.50	6.16	− 6 9.4	− 8 8.1	− 10 17.4	210 30.6	167 58.5

The factor to be multiplied by *a* and *b* to obtain the axes of—

The inner ellipse of the outer ring = 0.8801 log factor = 9.9445
The outer ellipse of the inner ring = 0.8599 log factor = 9.9344
The inner ellipse of the inner ring = 0.6650 log factor = 9.8228
The inner ellipse of the dusky ring = 0.5486 log factor = 9.7392

NOTE.—The negative sign of *l* indicates that the visible surface of the ring is the southern one.

Date.	Position Angle.	App. Distances. Ariel.	App. Distances. Umbriel.
Feb. 1,	13°.0	14″.7	20″.5
Apr. 1,	13.1	15.2	21.2
June 1,	13.3	14.8	20.6



Date.	Position Angle.	App. Distances. Titania.	App. Distances. Oberon.
Feb. 1,	13°.0	33″.5	44″.8
Apr. 1,	13.1	34.7	46.4
June 1,	13.3	33.9	45.3

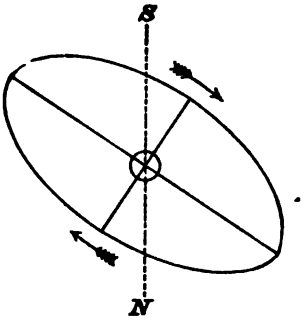
APPARENT ORBITS OF THE SATELLITES OF URANUS IN 1889, *AS SEEN IN AN INVERTING TELESCOPE.*

WASHINGTON MEAN TIMES OF GREATEST ELONGATIONS.

ARIEL.						UMBRIEL.						TITANIA.						OBERON.			
North.			South.			North.			South.			North.			South.			North and South.			
	d	h		d	h		d	h		d	h		d	h		d	h		d	h	
Jan.	0	19.6	Jan.	2	1.9	Jan.	1	17.2	Jan.	3	18.9	Jan.	2	18.5	Jan.	7	3.0	Jan.	1	0.8	S.
	8	9.1		9	15.3		10	0.1		12	1.8		11	11.4		15	19.9		7	18.4	N.
	15	22.5		17	4.8		18	7.0		20	8.7		20	4.3		24	12.8		14	11.9	S.
	23	12.0		24	18.2		26	13.9		28	15.6		28	21.2	Feb.	2	5.7		21	5.4	N.
	31	1.4	Feb.	1	7.7	Feb.	3	20.7	Feb.	5	22.5	Feb.	6	14.1		10	22.6		27	23.0	S.
Feb.	7	14.9		8	21.1		12	3.6		14	5.4		15	7.0		19	15.5	Feb.	3	16.5	N.
	15	4.3		16	10.6		20	10.5		22	12.3		23	23.9		28	8.4		10	10.0	S.
	22	17.8		24	0.0		28	17.4	Mar.	2	19.2	Mar.	4	16.8	Mar.	9	1.3		17	3.5	N.
Mar.	2	7.2	Mar.	3	13.5	Mar.	9	0.4		11	2.1		13	9.8		17	18.2		23	21.1	S.
	9	20.7		11	2.9		17	7.3		19	9.0		22	2.7		26	11.2	Mar.	2	14.6	N.
	17	10.1		18	16.4		25	14.2		27	15.9		30	19.6	Apr.	4	4.1		9	8.2	S.
	24	23.6		26	5.8	Apr.	2	21.1	Apr.	4	22.8	Apr.	8	12.6		12	21.0		16	1.7	N.
Apr.	1	13.1	Apr.	2	19.3		11	4.0		13	5.7		17	5.5		21	14.0		22	19.3	S.
	9	2.5		10	8.8		19	10.9		21	12.6		25	22.4		30	6.9		29	12.8	N.
	16	16.0		17	22.2		27	17.8		29	19.6	May	4	15.3	May	8	23.8	Apr.	5	6.3	S.
	24	5.4		25	11.7	May	6	0.7	May	8	2.5		13	8.3		17	16.8		11	23.9	N.
May	1	18.9	May	3	1.2		14	7.7		16	9.4		22	1.2		26	9.7		18	17.4	S.
	9	8.4		10	14.6		22	14.6		24	16.3		30	18.2	June	4	2.6		25	11.0	N.
	16	21.9		18	4.1		30	21.5	June	1	23.3	June	8	11.1		12	19.6	May	2	4.5	S.
	24	11.3		25	17.6	June	8	4.5		10	6.2		17	4.1		21	12.5		8	22.0	N.
June	1	0.8	June	2	7.1		16	11.4		18	13.1		25	21.0		30	5.5		15	15.6	S.
	8	14.3		9	20.5		24	18.3		26	20.1	July	4	14.0	July	8	22.4		22	9.1	N.
	16	3.8		17	10.0	July	3	1.3	July	5	3.0		13	6.9		17	15.4		29	2.7	S.
	23	17.2		24	23.5		11	8.2		13	9.9		21	23.8		26	8.3	June	4	20.3	N.
July	1	6.7	July	2	13.0		19	15.1		21	16.8								11	13.8	S.

	d	h		d	h
Period of Ariel,	2	12.489	Period of Titania,	8	16.942
Period of Umbriel,	4	3.460	Period of Oberon,	13	11.119

Note.—For Ariel only every third elongation is given, and for Umbriel every alternate one. The intermediate ones may be found by adding multiples of the period of the satellite.



Date.	Position Angle.	Apparent Distance.
	°	″
Jan. 18,	236.5	16.7
Sept. 22,	239.0	16.6
Nov. 19,	238.7	17.0

APPARENT ORBIT OF THE SATELLITE OF NEPTUNE IN 1889, *AS SEEN IN AN INVERTING TELESCOPE.*

WASHINGTON MEAN TIMES OF GREATEST ELONGATIONS.

South West.		North East.		South West.		North East.		South West.		North East.	
	d h		d h		d h		d h		d h		d h
Jan.	0 8.9	Jan.	3 7.4	Sept.	4 4.3	Sept.	7 2.8	Nov.	7 19.5	Nov.	10 18.0
	6 5.9		9 4.5		10 1.3		12 23.8		13 16.5		16 15.0
	12 3.0		15 1.5		15 22.3		18 20.8		19 13.5		22 12.1
	18 0.0		20 22.5		21 19.3		24 17.8		25 10.6		28 9.1
	23 21.1		26 19.6		27 16.3		30 14.9	Dec.	1 7.6	Dec.	4 6.1
	29 18.1	Feb.	1 16.6	Oct.	3 13.3	Oct.	6 11.9		7 4.6		10 3.1
Feb.	4 15.2		7 13.7		9 10.4		12 8.9		13 1.6		16 0.2
	10 12.2		13 10.7		15 7.4		18 5.9		18 22.6		21 21.2
	16 9.2		19 7.8		21 4.4		24 2.9		24 19.7		27 18.2
	22 6.3		25 4.8		27 1.4		30 0.0		30 16.8		33 15.3
	28 3.3	Mar.	3 1.9	Nov.	1 22.5	Nov.	4 21.0		36 13.8		

The above times are those of each passage of the satellite through an apsis of its apparent orbit. The position of the satellite at any other time may be found by measuring around the orbit from the apsis last passed through, remembering that the radius vector of the satellite describes equal areas in equal times.

Period of the satellite of Neptune, $5^d\ 21^h.045$.

In the above diagrams, the central circle represents the planet, and is on the same scale as the orbits.

WASHINGTON MEAN TIME.

PLANETARY CONSTELLATIONS.

	d	h	m			°	′
Jan.	1	–	–	☉	eclipsed, vis. at Wash.		
	1	9	4	☌ ☿ ☽	.... ☿ —	2	34
	1	19	39	☌ ♀ ♂	.... ♀ —	0	40
	4	5	–	☌ ♂ ☽	.... ♂ +	2	4
	4	6	36	☌ ♀ ☽	.... ♀ +	1	28
	9	14	24	☿	greatest Hel. Lat. S.		
	11	4	–	□ ♅ ☉			
	11	16	–	☌ ♆ ☽	.... ♆ +	2	33
	16	–	–	☽	eclipsed, vis. at Wash.		
	18	4	–	☌ ♄ ☽	.... ♄ —	1	21
	22	21	–	☌ ♅ ☽	.... ♅ +	5	2
	25	7	–	♅	Stationary.		
	27	16	4	☌ ♃ ☽	.... ♃ —	1	42
	28	14	7	☿	in ☊		
	29	19	–	☿	greatest elong. E.	18	22
	30	16	–	♀	in ☊		
	31	0	–	☿	greatest brilliancy.		
	31	23	30	☌ ☿ ☽	.... ☿ +	4	14
Feb.	2	3	52	☿	in Perihelion.		
	2	6	2	☌ ♂ ☽	.... ♂ +	3	51
	3	2	36	☌ ♀ ☽	.... ♀ +	5	37
	4	19	5	☍ ♄ ☉			
	4	19	9	☿	Stationary.		
	7	23	–	♆	Stationary.		
	7	23	16	☌ ♆ ☽	.... ♆ +	2	31
	12	11	41	☿	greatest Hel. Lat. N.		
	14	7	28	☌ ♄ ☽	.... ♄ —	1	5
	14	7	50	☌ ☿ ☉	Inferior.		
	17	6	–	□ ♆ ☉			
	17	14	10	♀	greatest elong. E.	46	36
	19	2	19	☌ ♅ ☽	.... ♅ —	4	53
	24	8	–	☌ ♃ ☽	.... ♃ —	1	11
	26	11	–	☿	Stationary.		
	27	9	–	☌ ☿ ☽	.... ☿ +	4	19
Mar.	3	6	45	☌ ♂ ☽	.... ♂ +	5	2
	4	17	32	☌ ♀ ☽	.... ♀ +	8	58
	5	3	–	♀	in Perihelion.		
	7	8	–	☌ ♆ ☽	.... ♆ +	2	20
	7	22	46	☿	in ☋		
	12	18	–	☿	greatest elong. W.	27	53
	13	13	2	☌ ♄ ☽	.... ♄ —	1	0
	18	3	49	☿	in Aphelion.		
	18	8	10	☌ ♅ ☽	.... ♅ —	4	44
	19	16	42	☉	enters ♈, Spring com.		
	23	19	–	☌ ♃ ☽	.... ♃ —	0	41
	25	1	–	♀	greatest brilliancy.		
	26	19	–	□ ♃ ☉			
	27	4	–	♀	greatest Hel. Lat. N.		
	28	18	53	☌ ☿ ☽	.... ☿ +	2	2
Apr.	1	9	10	☌ ♂ ☽	.... ♂ +	5	7
	2	12	3	☌ ♀ ☽	.... ♀ +	11	7
Apr.	3	17	24	☌ ♆ ☽	.... ♆ +	2	5
	5	6	22	♂	in ☊		
	7	12	35	☿	greatest Hel. Lat. S.		
	8	20	21	♀	Stationary.		
	9	0	–	☍ ♅ ☉			
	9	20	–	☌ ♄ ☽	.... ♄ —	1	10
	13	21	–	♄	Stationary.		
	14	15	41	☌ ♅ ☽	.... ♅ —	4	42
	20	3	2	☌ ♃ ☽	.... ♃ —	0	19
	24	6	–	♃	Stationary.		
	24	13	33	☌ ☿ ☉	Superior.		
	26	13	3	☿	in ☊		
	29	6	–	☌ ♀ ☽	.... ♀ +	10	15
	29	19	2	☌ ☿ ☽	.... ☿ +	5	3
	30	9	–	☌ ♀ ☉	Inferior.		
	30	10	–	☌ ♂ ☽	.... ♂ +	4	21
May	1	2	30	☌ ♆ ☽	.... ♆ +	1	54
	1	3	–	☿	in Perihelion.		
	1	12	–	☿	greatest brilliancy.		
	3	9	–	□ ♄ ☉			
	5	0	–	☌ ☿ ♂	.... ☿ +	1	9
	7	5	–	☌ ♄ ☽	.... ♄ —	1	28
	11	10	46	☿	greatest Hel. Lat. N.		
	12	0	5	☌ ♅ ☽	.... ♅ —	4	51
	12	2	–	☌ ♂ ♆	.... ♂ +	2	2
	17	10	–	☌ ♃ ☽	.... ♃ —	0	15
	19	19	–	♀	Stationary.		
	22	5	–	♀	in ☋		
	22	10	–	☌ ♆ ☉			
	24	2	–	☿	greatest elong. E.	22	49
	25	22	22	☌ ♀ ☽	.... ♀ +	4	29
	28	10	54	☌ ♆ ☽	.... ♆ +	1	49
	29	11	–	☌ ♂ ☽	.... ♂ +	3	3
	30	23	4	☌ ☿ ☽	.... ☿ +	1	53
June	3	15	1	☌ ♄ ☽	.... ♄ —	1	46
	3	22	6	☿	in ☋		
	5	9	–	♀	greatest brilliancy.		
	6	3	28	☿	Stationary.		
	8	8	23	☌ ♅ ☽	.... ♅ —	4	59
	13	16	–	☌ ♃ ☽	.... ♃ —	0	29
	14	3	–	☿	in Aphelion.		
	17	9	20	☌ ♂ ☉			
	18	18	–	☌ ☿ ☉	Inferior.		
	20	18	10	☉	enters ♋, Summer com.		
	23	13	2	☌ ♀ ☽	.... ♀ +	1	1
	24	2	–	☍ ♃ ☉			
	24	18	49	☌ ♆ ☽	.... ♆ +	1	46
	25	2	–	♅	Stationary.		
	25	14	–	♀	in Aphelion.		
	26	15	17	☌ ☿ ☽	.... ☿ —	3	5
	27	9	34	☌ ♂ ☽	.... ♂ +	1	33

WASHINGTON MEAN TIME.

PLANETARY CONSTELLATIONS.

	d	h	m			° ′
June	27	–	–	☉	eclipsed, invis. at Wash.	
	30	7	40	☿	Stationary.	
July	1	1	21	☉	Apogee.	
	1	2	1	☌ ♄ ☽	.... ♄ −	2 3
	4	12	40	☿	greatest Hel. Lat. S.	
	5	15	52	☌ ♅ ☽	.... ♅ −	5 3
	9	8	–	□ ♅ ☉		
	9	16	–	♀	greatest elong. W.	45 44
	10	10	56	☌ ♆ ♀	.... ♆ +	1 48
	10	21	–	☌ ♃ ☽	.... ♃ −	0 52
	11	17	–	☿	greatest elong. W.	20 47
	12	–	–	☽	eclipsed, invis. at Wash.	
	18	2	–	♀	greatest Hel. Lat. S.	
	22	3	2	☌ ♆ ☽	.... ♆ +	1 39
	23	4	–	☌ ♀ ☽	.... ♀ −	0 41
	23	12	35	☿	in ☊	
	26	2	21	☌ ☿ ☽	.... ☿ −	0 19
	26	6	–	☌ ♂ ☽	.... ♂ −	0 1
	27	12	11	☌ ♂ ☿	.... ♂ +	0 14
	28	2	17	☿	in Perihelion.	
	28	14	2	☌ ♄ ☽	.... ♄ −	2 16
	30	15	–	☿	greatest brilliancy.	
Aug.	1	22	49	☌ ♅ ☽	.... ♅ −	4 59
	7	2	39	☌ ☿ ☉	Superior.	
	7	3	7	☌ ♃ ☽	.... ♃ −	1 6
	7	10	5	☿	greatest Hel. Lat. N.	
	10	20	56	☌ ☿ ♄	.... ☿ +	0 38
	15	21	–	☌ ♄ ☉		
	18	11	–	☌ ♆ ☽	.... ♆ +	1 30
	22	5	3	☌ ♀ ☽	.... ♀ −	1 59
	24	1	2	☌ ♂ ☽	.... ♂ −	1 28
	24	12	–	♃	Stationary.	
	25	3	–	☌ ♄ ☽	.... ♄ −	2 28
	27	0	–	□ ♆ ☉		
	27	5	4	☌ ☿ ☽	.... ☿ −	4 57
	29	6	16	☌ ♅ ☽	.... ♅ −	4 52
	30	21	22	☿	in ☋	
Sept.	3	9	–	☌ ♃ ☽	.... ♃ −	1 2
	6	16	16	♆	Stationary.	
	10	2	17	☿	in Aphelion.	
	12	9	5	♀	in ☊	
	14	19	9	☌ ♆ ☽	.... ♆ +	1 15
	19	14	52	☌ ♂ ♄	.... ♂ +	0 1
	20	6	–	☿	greatest elong. E.	26 19
	21	8	27	☌ ♀ ☽	.... ♀ −	3 12
	21	17	–	☌ ♄ ☽	.... ♄ −	2 44
	21	19	–	□ ♃ ☉		
	21	20	–	☌ ♂ ☽	.... ♂ −	2 47
	22	4	–	☉	enters ♎, Autumn com.	
	25	15	10	☌ ♀ ♄	.... ♀ −	0 34
	25	16	1	☌ ♅ ☽	.... ♅ −	4 41
Sept.	26	4	3	☌ ☿ ☽	.... ☿ −	8 36
	30	12	10	☿	greatest Hel. Lat. S.	
	30	18	–	☌ ♃ ☽	.... ♃ −	0 39
	30	19	54	☌ ♀ ♂	.... ♀ −	0 22
Oct.	3	7	5	☿	Stationary.	
	7	7	–	♂	greatest Hel. Lat. N.	
	12	3	2	☌ ♆ ☽	.... ♆ +	1 1
	14	21	–	☌ ♅ ☉		
	15	0	13	☌ ☿ ♅	.... ☿ −	2 15
	15	8	2	☌ ☿ ☉	Inferior.	
	15	21	–	♀	in Perihelion.	
	19	7	9	☌ ♄ ☽	.... ♄ −	3 1
	19	12	–	☿	in ☊	
	20	13	–	☌ ♂ ☽	.... ♂ −	3 43
	21	13	14	☌ ♀ ☽	.... ♀ −	3 48
	22	17	2	☌ ☿ ☽	.... ☿ −	4 22
	23	4	–	☌ ♅ ☽	.... ♅ −	4 37
	23	18	–	☿	Stationary.	
	24	2	6	☿	in Perihelion.	
	28	6	–	☌ ♃ ☽	.... ♃ −	0 7
	30	23	–	☿	greatest elong. W.	18 43
Nov.	2	12	–	☿	greatest brilliancy.	
	2	16	33	☌ ☿ ♅	.... ☿ +	1 45
	3	14	4	☿	greatest Hel. Lat. N.	
	6	20	22	♀	greatest Hel. Lat. N.	
	8	9	46	☌ ♆ ☽	.... ♆ +	0 55
	9	1	45	☌ ♀ ♅	.... ♀ +	1 8
	11	12	–	♂	in Aphelion.	
	15	20	–	☌ ♄ ☽	.... ♄ −	3 14
	18	6	–	☌ ♂ ☽	.... ♂ −	4 8
	19	17	18	☌ ♅ ☽	.... ♅ −	4 39
	20	17	8	☌ ♀ ☽	.... ♀ −	3 2
	21	16	2	☌ ☿ ☽	.... ☿ −	3 2
	24	13	–	☍ ♆ ☉		
	24	23	–	☌ ♃ ☽	.... ♃ +	0 27
	24	23	–	□ ♄ ☉		
	26	20	34	☿	in ☋	
Dec.	5	15	26	☌ ♆ ☽	.... ♆ +	0 59
	7	1	34	☿	in Aphelion.	
	7	7	–	☌ ☿ ☉	Superior.	
	13	5	–	☌ ♄ ☽	.... ♄ −	3 18
	14	13	50	♄	Stationary.	
	16	23	–	☌ ♂ ☽	.... ♂ −	3 54
	17	5	20	☌ ♅ ☽	.... ♅ −	4 41
	20	19	27	☌ ♀ ☽	.... ♀ −	1 6
	20	21	52	☉	enters ♑, Winter com.	
	22	–	–	☉	eclipsed, invis. at Wash.	
	22	10	28	☌ ☿ ☽	.... ☿ −	1 27
	22	19	–	☌ ♃ ☽	.... ♃ +	1 0
	23	19	16	☌ ♂ ♅	.... ♂ +	0 55
	26	8	27	☌ ☿ ♃	.... ☿ −	2 0
	27	11	–	☿	greatest Hel. Lat. S.	

POSITIONS OF OBSERVATORIES.

(*North Latitudes and West Longitudes are Considered Positive.*)

Place.	Latitude.	Reduction to Geocentric Latitude.	Log ρ.	Longitude	
				From Washington.	From Greenwich.
	° ′ ″	′ ″		h m s	h m s
Åbo . . .	+ 60 26 56.8	— 9 53.5	9.998902	— 6 37 18.45	— 1 29 6.41
Adelaide . . .	— 34 55 33.8	+ 10 47.6	9.999527	—14 22 32.46	— 9 14 20.42
Albany . . .	+ 42 39 49.5	— 11 28.2	9.999336	— 0 13 12.39	+ 4 54 59.65
Alfred (N. Y.) . .	+ 42 15 19.8	— 11 27.2	9.999346	+ 0 2 55.00	+ 5 11 7.04
Algier . . .	+ 36 45 2.7	— 11 1.6	9.999483	— 5 20 23.43	— 0 12 11.39
Allegheny . .	+ 40 27 41.6	— 11 21.6	9.999391	+ 0 11 50.89	+ 5 20 2.93
Altona . . .	+ 53 32 45.3	— 11 0.8	9.999063	— 5 47 58.39	— 0 39 46.35
Amherst . . .	+ 42 22 17.1	— 11 27.5	9.999343	— 0 18 7.37	+ 4 50 4.67
Annapolis . .	+ 38 58 53.5	— 11 15.0	9.999428	— 0 2 15.60	+ 5 5 56.44
Ann Arbor . .	+ 42 16 48.0	— 11 27.3	9.999346	+ 0 26 43.10	+ 5 34 55.14
Arcetri . . .	+ 43 45 14.4	— 11 29.9	9.999308	— 5 53 15.15	— 0 45 3.11
Armagh . . .	+ 54 21 12.7	— 10 54.9	9.999043	— 4 41 36.54	+ 0 26 35.5
Athens . . .	+ 37 58 20.0	— 11 9.4	9.999453	— 6 43 7.74	— 1 34 55.7
Beloit . . .	+ 42 30 9.0	— 11 27.8	9.999340	+ 0 47 55.26	+ 5 56 7.30
Berlin . . .	+ 52 30 16.7	— 11 7.7	9.999088	— 6 1 46.95	— 0 53 34.91
Berne . . .	+ 46 57 8.7	— 11 29.2	9.999227	— 5 37 58.04	— 0 29 46.0
Bethlehem . .	+ 40 36 23.9	— 11 22.2	9.999388	— 0 6 40.19	+ 5 1 31.85
Birr Castle . .	+ 53 5 47.0	— 11 3.9	9.999074	— 4 36 31.14	+ 0 31 40.9
Bologna . . .	+ 44 29 47.0	— 11 30.5	9.999289	— 5 53 36.64	— 0 45 24.6
Bonn . . .	+ 50 43 45.0	— 11 17.3	9.999132	— 5 36 35.33	— 0 28 23.29
Bordeaux . .	+ 44 50 16.7	— 11 30.7	9.999281	— 5 6 6.60	+ 0 2 5.44
Bothkamp . .	+ 54 12 9.6	— 10 56.0	9.999047	— 5 48 42.84	— 0 40 30.8
Breslau . . .	+ 51 6 56.5	— 11 15.4	9.999122	— 6 16 20.75	— 1 8 8.71
Brussels . . .	+ 50 51 10.5	— 11 16.8	9.999129	— 5 25 40.64	— 0 17 28.6
Cambridge (*England*)	+ 52 12 51.6	— 11 9.4	9.999095	— 5 8 34.79	— 0 0 22.75
Cambridge (*Mass.*) .	+ 42 22 47.6	— 11 27.6	9.999343	— 0 23 41.05	+ 4 44 30.99
Cape of Good Hope .	— 33 56 3.4	+ 10 39.0	9.999550	— 6 22 6.78	— 1 13 54.74
Chapultepec . .	+ 19 25 17.5	— 7 12.0	9.999841	+ 1 28 26.20	+ 6 36 38.24
Charkow . . .	+ 50 0 10.2	— 11 20.5	9.999150	— 7 33 6.74	— 2 24 54.7
Chicago . . .	+ 41 50 1.0	— 11 26.2	9.999357	+ 0 42 15.02	+ 5 50 27.06
Christiania . .	+ 59 54 43.7	— 10 0.2	9.998914	— 5 51 5.89	— 0 42 53.85
Cincinnati (*New Obs.*)	+ 39 8 19.5	— 11 15.8	9.999424	+ 0 29 29.25	+ 5 37 41.29
Cincinnati (*Old Obs.*)	+ 39 6 26.5	— 11 15.6	9.999425	+ 0 29 47.01	+ 5 37 59.05
Clinton . . .	+ 43 3 17.0	— 11 28.9	9.999326	— 0 6 34.65	+ 5 1 37.39
Coimbra . . .	+ 40 12 25.8	— 11 20.6	9.999398	— 4 34 37.54	+ 0 33 34.5
Copenhagen . .	+ 55 41 13.6	— 10 43.9	9.999011	— 5 58 30.96	— 0 50 18.92
Cordoba . . .	— 31 25 15.5	+ 10 13.5	9.999608	— 0 51 23.84	+ 4 16 48.2
Cracow . . .	+ 50 3 50.0	— 11 20.3	9.999149	— 6 28 2.41	— 1 19 50.37
Dantzig . . .	+ 54 21 18.0	— 10 54.9	9.999043	— 6 22 51.34	— 1 14 39.3
Dorpat . . .	+ 58 22 47.4	— 10 17.6	9.998948	— 6 55 5.54	— 1 46 53.5
Dresden . . .	+ 51 2 16.8	— 11 15.8	9.999124	— 6 3 6.88	— 0 54 54.84
Dublin . . .	+ 53 23 13	— 11 1.9	9.999066	— 4 42 50.04	+ 0 25 22
Düsseldorf . .	+ 51 12 25	— 11 15.0	9.999120	— 5 35 17.04	— 0 27 5
Dun Echt . .	+ 57 9 36	— 10 30.2	9.998977	— 4 58 32.04	+ 0 9 40.0
Durham . . .	+ 54 46 6.2	— 10 51.6	9.999033	— 5 1 52.24	+ 0 6 19.8
Edinburgh . .	+ 55 57 23.2	— 10 41.5	9.999005	— 4 55 28.99	+ 0 12 43.05
Florence . . .	+ 43 46 4.1	— 11 29.9	9.999308	— 5 53 13.54	— 0 45 1.5

POSITIONS OF OBSERVATORIES.

(*North Latitudes and West Longitudes are Considered Positive.*)

Place.	Latitude.	Reduction to Geocentric Latitude.	Log ρ.	Longitude	
				From Washington.	From Greenwich.
	° ′ ″	′ ″		h m s	h m s
Geneva . . .	+ 46 11 58.8	− 11 30.1	9.999246	− 5 32 48.81	− 0 24 36.77
Georgetown . .	+ 38 54 26.2	− 11 14.6	9.999430	+ 0 0 6.20	+ 5 8 18.24
Glasgow (*Missouri*) .	+ 39 13 45.6	− 11 16.2	9.999422	+ 1 3 5.93	+ 6 11 17.97
Glasgow (*Scotland*) .	+ 55 52 42.8	− 10 42.2	9.999006	− 4 51 1.44	+ 0 17 10.6
Göttingen . .	+ 51 31 47.9	− 11 13.3	9.999112	− 5 47 58.28	− 0 39 46.24
Gotha . . .	+ 50 56 37.5	− 11 16.3	9.999127	− 5 51 2.57	− 0 42 50.53
Greenwich . .	+ 51 28 38.4	− 11 13.6	9.999113	− 5 8 12.04	0 0 0
Hamburg . .	+ 53 33 7.0	− 11 0.8	9.999062	− 5 48 5.74	− 0 39 53.7
Hanover . . .	+ 43 42 15	− 11 29.8	9.999309	− 0 19 4.13	+ 4 49 7.91
Hastings-on-Hudson.	+ 40 59 25	− 11 23.6	9.999378	− 0 12 42.4	+ 4 55 29.64
Haverford . .	+ 40 0 40.1	− 11 19.8	9.999402	− 0 6 59.34	+ 5 1 12.70
Helsingfors . .	+ 60 9 43.3	− 9 57.1	9.998909	− 6 48 1.20	− 1 39 49.16
Hudson . . .	+ 41 14 42.6	− 11 24.4	9.999371	+ 0 17 32.12	+ 5 25 44.16
Ipswich . . .	+ 52 0 33.0	− 11 11.0	9.999100	− 5 13 7.84	− 0 4 55.80
Karlsruhe . .	+ 49 0 29.6	− 11 24.2	9.999175	− 5 41 48.55	− 0 33 36.51
Kasan . . .	+ 55 47 24.2	− 10 43.0	9.999009	− 8 24 40.94	− 3 16 28.9
Kew . . .	+ 51 28 6	− 11 13.6	9.999114	− 5 6 56.94	+ 0 1 15.1
Kiel . . .	+ 54 20 29.7	− 10 55.0	9.999043	− 5 48 47.80	− 0 40 35.76
Kiew . . .	+ 50 27 11.1	− 11 18.6	9.999139	− 7 10 12.68	− 2 2 0.64
Königsberg . .	+ 54 42 50.6	− 10 52.0	9.999034	− 6 30 10.95	− 1 21 58.91
Kremsmünster . .	+ 48 3 23.7	− 11 27.0	9.999199	− 6 4 44.24	− 0 56 32.2
Leiden . . .	+ 52 9 20.0	− 11 9.8	9.999097	− 5 26 8.39	− 0 17 56.35
Leipzig . . .	+ 51 20 6.3	− 11 14.3	9.999117	− 5 57 46.06	− 0 49 34.02
Leyton . . .	+ 51 34 34	− 11 13.0	9.999111	− 5 8 11.17	+ 0 0 0.87
Lisbon (*Marine Obs.*)	+ 38 42 17.6	− 11 13.5	9.999435	− 4 31 47.04	+ 0 36 25.0
Lisbon (*Royal Obs.*).	+ 38 42 31.3	− 11 13.6	9.999435	− 4 31 27.36	+ 0 36 44.68
Liverpool . .	+ 53 24 4	− 11 1.8	9.999066	− 4 55 54.84	+ 0 12 17.2
Lübec . . .	+ 53 51 31.2	− 10 58.6	9.999055	− 5 50 57.59	− 0 42 45.55
Lund . . .	+ 55 41 52.1	− 10 43.8	9.999011	− 6 0 57.07	− 0 52 45.03
Lyons . . .	+ 45 41 40.0	− 11 30.5	9.999259	− 5 27 19.90	− 0 19 7.86
Madison . . .	+ 43 4 37.0	− 11 28.9	9.999325	+ 0 49 24.11	+ 5 57 36.15
Madras . . .	+ 13 4 8.1	− 5 3.3	9.999926	−10 29 11.44	− 5 20 59.4
Madrid . . .	+ 40 24 30.0	− 11 21.4	9.999393	− 4 53 26.64	+ 0 14 45.4
Manheim . . .	+ 49 29 11.0	− 11 22.5	9.999163	− 5 42 2.56	− 0 33 50.52
Marburg . . .	+ 50 48 46.9	− 11 16.9	9.999130	− 5 43 17.04	− 0 35 5.0
Markree . . .	+ 54 10 31.8	− 10 56.2	9.999047	− 4 34 23.64	+ 0 33 48.4
Marseilles . .	+ 43 18 19.1	− 11 29.3	9.999320	− 5 29 46.68	− 0 21 34.64
Melbourne . .	− 37 49 53.3	+ 11 8.6	9.999456	−14 48 6.21	− 9 39 54.17
Mexico . . .	+ 19 26 1.3	− 7 12.2	9.999840	+ 1 28 14.63	+ 6 36 26.67
Milan . . .	+ 45 27 59.2	− 11 30.6	9.999265	− 5 44 58.01	− 0 36 45.97
Modena . . .	+ 44 38 52.8	− 11 30.6	9.999285	− 5 51 54.84	− 0 43 42.8
Montsouris . .	+ 48 49 18.0	− 11 24.8	9.999180	− 5 17 32.72	− 0 9 20.68
Moscow . . .	+ 55 45 19.8	− 10 43.3	9.999009	− 7 38 28.94	− 2 30 16.9
Mount Hamilton .	+ 37 20 23.5	− 11 5.5	9.999468	+ 2 58 22.05	+ 8 6 34.09
Munich . . .	+ 48 8 45.5	− 11 26.7	9.999197	− 5 54 38.17	− 0 46 26.13
Naples . . .	+ 40 51 45.4	− 11 23.1	9.999381	− 6 5 12.94	− 0 57 0.9
Nashville . .	+ 36 8 58.2	− 10 57.3	9.999497	+ 0 38 55.93	+ 5 47 7.97

POSITIONS OF OBSERVATORIES.

(*North Latitudes and West Longitudes are Considered Positive.*)

Place.	Latitude.	Reduction to Geocentric Latitude.	Log ρ.	Longitude From Washington.	Longitude From Greenwich.
	° ′ ″	′ ″		h m s	h m s
Natal . . .	− 29 50 47.0	+ 9 55.2	9.999642	− 7 10 13.20	− 2 2 1.16
Neuchatel . .	+ 46 59 51.0	− 11 29.1	9.999226	− 5 36 2.24	− 0 27 50.2
New Haven . .	+ 41 18 36.5	− 11 24.6	9.999370	− 0 16 29.90	+ 4 51 42.14
New York (*Columb. Coll.*)	+ 40 45 23.1	− 11 22.7	9.999384	− 0 12 18.40	+ 4 55 53.64
New York (RUTHERFURD)	+ 40 43 48.5	− 11 22.6	9.999384	− 0 12 15.00	+ 4 55 57.04
Nice . . .	+ 43 43 16.7	− 11 29.8	9.999309	− 5 37 24.24	− 0 29 12.20
Nicolaeff . . .	+ 46 58 20.6	− 11 29.2	9.999226	− 7 16 6.14	− 2 7 54.1
Odessa . . .	+ 46 28 36	− 11 29.8	9.999239	− 7 11 14.34	− 2 3 2.3
Ogden . . .	+ 41 13 8.6	− 11 24.3	9.999372	+ 2 19 47.52	+ 7 27 59.56
Ó-Gyalla . . .	+ 47 52 43.4	− 11 27.4	9.999204	− 6 20 57.63	− 1 12 45.59
Olmütz . . .	+ 49 35 43	− 11 22.1	9.999160	− 6 17 14.64	− 1 9 2.6
Oxford (*Mississippi*)	+ 34 22 12.6	− 10 42.9	9.999540	+ 0 49 55.05	+ 5 58 7.09
Oxford (*Radcliffe*) .	+ 51 45 36.0	− 11 12.0	9.999106	− 5 3 9.44	+ 0 5 2.6
Oxford (*University*) .	+ 51 45 34.2	− 11 12.0	9.999106	− 5 3 11.64	+ 0 5 0.40
Padua . . .	+ 45 24 2.5	− 11 30.6	9.999266	− 5 55 41.17	− 0 47 29.13
Palermo . . .	+ 38 6 44	− 11 10.2	9.999449	− 6 1 37.04	− 0 53 25.0
Paramatta . .	− 33 48 49.8	+ 10 37.8	9.999553	−15 12 18.24	−10 4 6.2
Paris . . .	+ 48 50 11.8	− 11 24.8	9.999179	− 5 17 32.99	− 0 9 20.95
Philadelphia . .	+ 39 57 7.5	− 11 19.5	9.999404	− 0 7 33.58	+ 5 0 38.46
Plonsk . . .	+ 52 37 40.0	− 11 6.9	9.999085	− 6 29 44.05	− 1 21 32.01
Pola . . .	+ 44 51 49.0	− 11 30.6	9.999280	− 6 3 35.22	− 0 55 23.18
Portsmouth . .	+ 50 48 3.0	− 11 17.0	9.999130	− 5 3 48.14	+ 0 4 23.90
Potsdam . . .	+ 52 22 56	− 11 8.4	9.999091	− 6 0 29.04	− 0 52 17
Poughkeepsie . .	+ 41 41 18	− 11 25.8	9.999360	− 0 12 38.44	+ 4 55 33.6
Prague . . .	+ 50 5 18.8	− 11 20.2	9.999148	− 6 5 53.44	− 0 57 41.4
Princeton . .	+ 40 20 57.8	− 11 21.2	9.999394	− 0 9 34.54	+ 4 58 37.50
Pulkowa . . .	+ 59 46 18.7	− 10 1.8	9.998917	− 7 9 30.71	− 2 1 18.67
Quebec . . .	+ 46 48 17.3	− 11 29.4	9.999231	− 0 23 22.74	+ 4 44 49.3
Rio de Janeiro . .	− 22 54 23.8	+ 8 14.0	9.999782	− 2 15 30.63	+ 2 52 41.41
Rochester . .	+ 43 8 15	− 11 29.0	9.999324	+ 0 3 8.04	+ 5 11 20.08
Rome (*Coll. Rom.*) .	+ 41 53 53.7	− 11 26.3	9.999355	− 5 58 6.74	− 0 49 54.70
San Fernando . .	+ 36 27 41.5	− 10 59.5	9.999490	− 4 43 22.44	+ 0 24 49.6
Santiago de Chile .	− 33 26 42.0	+ 10 34.4	9.999561	− 0 25 25.74	+ 4 42 46.30
Schwerin . . .	+ 53 37 38.2	− 11 0.2	9.999061	− 5 53 52.74	− 0 45 40.7
Senftenberg . .	+ 50 5 10.1	− 11 20.2	9.999148	− 6 14 2.64	− 1 5 50.6
South Hadley . .	+ 42 15 18.2	− 11 27.3	9.999346	− 0 17 51.75	+ 4 50 20.29
Speier . . .	+ 49 18 55.4	− 11 23.2	9.999167	− 5 41 57.64	− 0 33 45.6
St. Louis . . .	+ 38 38 3.6	− 11 13.2	9.999437	+ 0 52 37.07	+ 6 0 49.11
St. Petersburg . .	+ 59 56 29.7	− 9 59.8	9.998913	− 7 9 25.54	− 2 1 13.5
Stockholm . .	+ 59 20 33.0	− 10 6.9	9.998927	− 6 20 26.04	− 1 12 14.00
Stonyhurst . .	+ 53 50 40	− 10 58.7	9.999055	− 4 58 19.36	+ 0 9 52.68
Strassburg (*New Obs.*)	+ 48 34 59.7	− 11 25.5	9.999186	− 5 39 16.69	− 0 31 4.65
Strassburg (*Old Obs.*)	+ 48 34 53.8	− 11 25.5	9.999186	− 5 39 14.53	− 0 31 2.49
Sydney . . .	− 33 51 41.1	+ 10 38.3	9.999552	−15 13 1.64	−10 4 49.6
Taschkent . .	+ 41 19 32.2	− 11 24.7	9.999369	− 9 45 22.84	− 4 37 10.80
Toulouse . . .	+ 43 36 47	− 11 29.7	9.999312	− 5 14 3.14	− 0 5 51.1
Turin . . .	+ 45 4 6.0	− 11 30.7	9.999275	− 5 39 0.44	− 0 30 48.4

POSITIONS OF OBSERVATORIES.

(*North Latitudes and West Longitudes are Considered Positive.*)

Place.	Latitude.	Reduction to Geocentric Latitude.	Log ρ.	Longitude	
				From Washington.	From Greenwich.
	° ′ ″	′ ″		h m s	h m s
Twickenham . .	+ 51 27 4.2	− 11 13.7	9.999114	− 5 6 58.94	+ 0 1 13.1
Univ. of Virginia .	+ 38 2 1.2	− 11 9.8	9.999448	+ 0 5 48.68	+ 5 14 00.72
Upsala . . .	+ 59 51 31.5	− 10 0.8	9.998915	− 6 18 42.23	− 1 10 30.19
Utrecht . . .	+ 52 5 10.5	− 11 10.2	9.999098	− 5 28 43.74	− 0 20 31.7
Venice . . .	+ 45 25 49.5	− 11 30.6	9.999266	− 5 57 37.44	− 0 49 25.4
Vienna (*Josephstadt*)	+ 48 12 53.8	− 11 26.6	9.999195	− 6 13 37.34	− 1 5 25.3
Vienna (*New Obs.*) .	+ 48 13 55.4	− 11 26.5	9.999195	− 6 13 33.26	− 1 5 21.22
Vienna (*Old Obs.*) .	+ 48 12 35.5	− 11 26.6	9.999195	− 6 13 43.78	− 1 5 31.74
Warsaw . . .	+ 52 13 5.7	− 11 9.4	9.999095	− 6 32 19.44	− 1 24 7.4
Washington . .	+ 38 53 38.8	− 11 14.5	9.999430	0 0 0	+ 5 8 12.04
West Point . .	+ 41 23 31	− 11 24.9	9.999368	− 0 12 22.71	+ 4 55 49.33
Wilhelmshaven .	+ 53 31 52.0	− 11 0.9	9.999063	− 5 40 47.25	− 0 32 35.21
Williamstown (*Mass.*)	+ 42 42 49	− 11 28.3	9.999334	− 0 15 18.6	+ 4 52 53.44
Williamstown (*Victoria*)	− 37 52 7.2	+ 11 8.8	9.999455	−14 47 50.84	− 9 39 38.8
Wilna . . .	+ 54 41 0	− 10 52.3	9.999035	− 6 49 23.94	− 1 41 11.9
Windsor . . .	− 33 36 28.9	+ 10 35.9	9.999558	−15 11 32.81	−10 3 20.77
Zürich . . .	+ 47 22 40.0	− 11 28.5	9.999216	− 5 42 24.64	− 0 34 12.6

ON THE ARRANGEMENT AND USE OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

PART I—THE EPHEMERIS FOR THE MERIDIAN OF GREENWICH.

THE greater portion of this Ephemeris, embracing the positions of the sun and moon; the distances of the moon from the centres of the sun and the four most conspicuous planets, and from certain fixed stars; the ephemerides of the planets Mercury, Venus, Mars, Jupiter, and Saturn, is designed for the special use of navigators. The remainder contains the ephemeris of Uranus and Neptune, the heliocentric co-ordinates of the seven major planets, the rectangular equatorial co-ordinates of the sun, the moon's longitude and latitude, data for the libration of the moon, the obliquity of the ecliptic, the equation of the equinoxes, etc.

TIME.

Astronomers make use of several different kinds of time: mean solar time; true, or apparent solar time, and sidereal time.

Solar Time.—Solar time is that used for all the purposes of ordinary life, and is measured by the daily motion of the sun. A *Solar Day* is the interval of time between two successive transits of the sun over the same meridian; and the hour-angle of the sun is called *Solar Time.* This is the most natural and direct measure of time. But the intervals between the successive returns of the sun to the same meridian are not exactly equal, owing to the varying motion of the earth around the sun, and to the obliquity of the ecliptic. The intervals between the sun's transits over the meridian being unequal, it is impossible to regulate a clock or chronometer so that it shall accurately follow the sun.

To avoid the irregularity which would arise from using the true sun as the measure of time, a fictitious sun, called the *Mean Sun*, is supposed to move in the equator with a uniform velocity. This mean sun is supposed to keep, on the average, as near the real sun as is consistent with perfect uniformity of motion; it is sometimes in advance of it, and sometimes behind it, the greatest deviation being about 16 minutes of time.

Mean Solar Time, which is perfectly equable in its increase, is measured by the motion of this mean sun. The clocks in ordinary use and the chronometers used by navigators are regulated to mean solar time.

True, or *Apparent Solar Time* is measured by the motion of the real sun.

The difference between apparent and mean time is called the *Equation of Time.* By means of it, we change apparent to mean time, or the reverse. Thus, if the apparent time be given, the mean time corresponding to it will be obtained by adding or subtracting the equation of time, according to the precept at the head of the column in which it is found, on page I of the Calendar for each month. If the mean time be given, the apparent time is obtained by applying the equation of time as directed by the precept on page II of the Calendar.

Sidereal Time.—Sidereal time is measured by the daily motion of the stars; or, as it is used by astronomers, by the daily motion of that point in the equator from which the true right ascension of the stars is counted. This point is the vernal equinox, and its hour-angle is called *Sidereal Time.* Astronomical clocks, regulated to sidereal time, are called sidereal clocks.

A *Sidereal Day* is the interval of time between the transit of the vernal equinox over any meridian, and its next succeeding return to the same meridian. It is about $3^m\ 56^s$ shorter than the mean solar day; 365¼ solar days, or a year, being divided into 366¼ sidereal days. It is divided into 24 hours. The sidereal hours are counted from 0 to 24, commencing with the instant of the passage of the true vernal equinox over the upper meridian, and ending with its return to the same meridian. About March 21st of each year the sidereal clock agrees with the mean time, or ordinary clock, and the former gains on the latter about $3^m\ 56^s$ per day, so that at the end of a year it will have gained an entire day, and will again agree with the mean time clock.

Day.—The *Civil Day*, according to the customs of society, commences at midnight, and comprises twenty-four hours from one midnight to the next following. The hours are counted from 0 to 12 from midnight to noon, after which they are again reckoned from 0 to 12 from noon to midnight. Thus the day is divided into two periods of 12 hours each, of which the first is marked A. M., and the last is marked P. M.

The *Astronomical Day* commences at noon on the civil day of the same date. It also comprises twenty-four hours, but they are reckoned from 0 to 24, and from the noon of one day to that of the next following. The astronomical as well as the civil time may be either apparent or mean, according as it is reckoned from apparent noon or from mean noon.

The civil day begins twelve hours before the astronomical day; therefore the first period of the civil day answers to the last part of the preceding astronomical day, and the last period of the civil day corresponds to the first part of the same astronomical day. Thus, January 9th, 2 o'clock, A. M., civil time, is January 8th, 14^h, astronomical time; and January 9th, 2 o'clock, P. M., civil time, is also January 9th, 2^h, astronomical time. The rule, then, for the transformation of civil time into astronomical time is this:—*If the civil time is marked A. M., take one from the day and add twelve to the hours, and the result is the astronomical time wanted; if the civil time is marked P. M., take away the designation P. M., and the astronomical time is had without further change.*

To change astronomical to civil time, we simply write P. M. after it, if it is less than 12 *hours. If greater than* 12 *hours, we subtract* 12 *hours from it, add* 1 *to the days, and write A. M.* For example, January 3d, 23 hours, astronomical time, is January 4th, 11 o'clock, A. M. civil time.

If the longitude from Greenwich be expressed in time, and, when *west*, *added* to the local time, or, when *east*, *subtracted* from the local time, the result is the corresponding Greenwich time. If the local mean time is used, the result is the Greenwich mean time, which ordinarily is that required for the use of this Ephemeris. The rule is the same, whether we use mean or sidereal time.

THE CALENDAR.

The Calendar is divided into twelve months, and to each month are assigned eighteen pages, the contents of which are as follow:—

Page I contains, for Greenwich apparent noon of each day, *The Sun's Apparent Right Ascension* and *Declination*, and the *Equation of Time.* Adjoining columns contain the differences of these quantities for one hour. By multiplying this difference by the hours and parts of an hour from Greenwich apparent noon, and adding the amount to, or subtracting it from, the quantity at noon, according as that quantity is increasing or decreasing, we obtain the value of any quantity for any given Greenwich apparent time. The hourly differences are given for the instant of apparent noon at Greenwich, and, when greater accuracy is required, should be first interpolated for half the hours and parts of an hour of the Greenwich apparent time.

This page is chiefly used when the sun is observed on the meridian, and the local apparent time is $0^h 0^m 0^s$. The longitude from Greenwich expressed in time, if west, is at that instant the Greenwich apparent time, or time after Greenwich apparent noon; if east, it is time before

Greenwich apparent noon. The longitude of any place is therefore employed in reducing the quantities on this page to apparent noon at the place.

The right ascension of the sun thus reduced is the sidereal time of local apparent noon. The difference between it and the clock time of the meridian passage of the sun is the error of the clock on sidereal time.

The declination of the sun reduced to the meridian, or apparent noon, of the place, is required in finding the latitude from a meridian altitude of the sun.

As an example of the use of page I: —

Let the sun's declination be required at apparent noon, 1889, May 30, at a place whose longitude is 180° 20′, or $12^h 1^m 20^s$ west from Greenwich:

		h	m	s
Local apparent time . . .	May 30,	0	0	0
Longitude from Greenwich (additive) . . .		12	1	20
Greenwich apparent time . . .	May 30,	12	1	20

Reducing the minutes and seconds to decimals of an hour, we find that this moment is $12^h.022$ after Greenwich apparent noon on May 30, or $11^h.978$ before Greenwich apparent noon on May 31.

On page 74 of the Ephemeris we find that the change of declination in one hour is

	″
May 30, at Greenwich apparent noon . . .	21.88
May 31, at Greenwich apparent noon . . .	20.93
Difference for one day	0.95

If we want to be very exact, we find the amount of this hourly difference for the time which is half way between Greenwich noon and the time of observation; that is, for 6 hours after Greenwich noon of the 30th, this being half of 12 hours. Six hours is 0.25 of a day; so the calculation is as follow: —

	″
Difference for one hour, May 30	21.88
Change for 0.25 of a day or 0″.95 × 0.25 . . .	0.24
Difference at 6 hours after noon	21.64

21″.64 × 12.022 = 260″.1 = 4′ 20″.1

Declination at Greenwich noon, May 30 . . .	N. 21° 56′ 36″.5
Change in 12.022 hours (additive) . . .	4 20.1
Sun's declination at time of observation . . .	N. 21 54 56.6

When the time of observation is only a few hours before Greenwich noon, it may be better to count the longitude backward from this nearest noon. Thus, in the example just given, the time is $11^h.978$ before Greenwich noon of May 31; half this interval is about 0.25 of a day, and the hourly motion for the middle of the interval is 21″.2. Then, we find: —

Declination at Greenwich noon, May 31 . .	N. 21° 59′ 10″.5
Product of 21″.2 × 11.978 = 253″.9 (subtractive) .	4 13.9
Sun's declination at time of observation . . .	N. 21 54 56.6

It will always be well to make the calculation by both methods, as their agreement will show both to be right.

At sea it is ordinarily sufficient to have the declination to the nearest half minute, and the reduction may be found by Table V of BOWDITCH's *American Practical Navigator*.

The equation of time, as has been before explained, is the number of minutes and seconds to be added to or subtracted from the apparent time, or the time given by an observation of the sun, to obtain the mean time. The heading of the column directs the manner in which the equation is to be applied. When there is a change in the course of the month from addition to subtraction or the reverse (as in the months of April and June), the two different directions are separated by a line, while a corresponding line below points out the dates between which the change takes place. The equation of time, as given on page I, is the mean time of apparent noon, or the hour-angle of the mean sun at that instant.

The Sun's Semidiameter and the *Sidereal Time of Semidiameter Passing Meridian* are also given on page I. The sun's semidiameter is used in reducing the altitude of the upper or lower limb of the sun to the altitude of the centre; and in reducing the angular distance of the limb from the moon or some other object, to the distance from the centre of the sun. The sidereal time of semidiameter passing the meridian is employed in obtaining the passage of the sun's centre over the wires of a transit-instrument, when the passage of one limb only has been observed. The quantity found in this column is to be added to the time of transit of the first, or western, limb; and to be subtracted from the time of transit of the second, or eastern, limb.

Page II contains, for Greenwich mean noon of each day, *The Sun's Apparent Right Ascension*, and *Declination*, the *Equation of Time* and the *Sidereal Time of Mean Noon*. The hourly changes of these quantities are also given, and may be used in reducing them to any Greenwich mean time. The hourly changes may be first interpolated for half the Greenwich time, when great precision is required, in the way described in explaining the calculation of the declination.

The right ascension and declination on pages I and II are affected by aberration, and therefore denote the *apparent* position of the *true* sun. Page II is more conveniently used when the mean time is known. This is the case in most observations of the sun out of the meridian, when the times have been noted by a clock or chronometer regulated to mean time. The quantities on this page can be reduced to mean noon of any place by interpolating for the longitude, as in the example of the sun's declination on the preceding page.

The sun's declination is required for finding the latitude of the place, the local time, and the sun's azimuth and amplitude, from observations of the sun.

The equation of time is needed in finding the mean time from observations of the sun, and the latitude from observations out of the meridian. The heading of the column directs the manner in which it is to be applied to mean time to obtain the apparent time.

The equation of time, as given on page II, is the apparent time of mean noon; and is equivalent to the hour-angle of the true sun at the instant of mean noon.

The sidereal time of mean noon is also the right ascension of the mean sun at Greenwich mean noon. It may be reduced for the longitude, or to any Greenwich mean time, by using the hourly difference, $9^s.8565$; or by Table III, appended to this volume, for reducing intervals of mean solar to sidereal time. Table LI of BOWDITCH'S *Navigator* may be used for the same purpose when only the nearest quarter of a second is required.

The sun's right ascension and the sidereal time of mean noon, or right ascension of the mean sun, are useful in converting mean time to sidereal time. We first find the Greenwich mean time, then the R. A. of the mean sun for this time, as last explained: this being added to the local mean time will give the sidereal time.

The sidereal time of mean noon, reduced for the longitude of the place, is also used in converting sidereal time to mean time. Subtracting the reduced value from the given sidereal time, gives the interval of sidereal time from noon. Subtracting from this the corresponding reduction of a sidereal interval to a mean time interval, in Table II, appended to this volume, or Table LII of BOWDITCH'S *Navigator*, will give the mean time required. This reduction may also be found by multiplying $9^s.8296$ by the hours and parts of an hour of the given sidereal time.

As examples of the use of page II:—

1.—Let the sun's right ascension and the equation of time be required for 1889, May 15, $9^h\ 2^m\ 30^s$, A. M., mean time, at a place whose longitude is 100° 10′, or $6^h\ 40^m\ 40^s$, west of Greenwich.

		h	m	s	
Local astronomical mean time . . .	**May 14,**	**21**	**2**	**30**	
Longitude from Greenwich (additive) . .		**6**	**40**	**40**	
Greenwich mean time	**May 15,**	**3**	**43**	**10**	**= $3^h.7194$**

Sun's Right Ascension.

	h	m	s
May 15, Greenwich noon .	3	29	45.97
H. D. $9^s.880 \times 3.7194$ . .	+	0	36.75
	3	30	22.72

Equation of Time.

	m	s	
May 15, noon . .	3	50.84	(additive)
H. D. — $0^s.024 \times 3.72$.	—	0.09	
	3	50.75	

In this case, the hourly differences interpolated to half the interval, or $1^h.9$ after noon, have been used.

The equation of time in this example is additive to mean time. Its reduction could also have been found by Table VI, A., of Bowditch's *Navigator*, but to seconds only.

2.—If the sidereal time is required for the same date and time, we have:—

	h	m	s
May 15, Sidereal Time (at Greenwich mean noon) . . .	3	33	36.81
Hourly difference $9^s.8565 \times 3.7194$	+	0	36.66
Add the local astronomical mean time	21	2	30 00
The required sidereal time is (rejecting 24^h)	0	36	43.47

The reduction $0^m 36^s.66$ could have been found in Table III corresponding to the Greenwich mean time $3^h 43^m 10^s$. Also, by Table LI of Bowditch's *Navigator*, the reduction is $0^m 36^s.7$.

3.—On 1889, May 15, A. M., at a place whose longitude is 100° 10′ W., suppose the sidereal time to be $0^h 36^m 37^s.16$, and that the corresponding mean time is required.

The astronomical day is May 14; the longitude in time, $+6^h 40^m 40^s$, or $+6^h.678$.

	h	m	s	
May 14, Sidereal Time (at Greenwich mean noon)	3	29	40.25	
The H. D. $9^s.8565 \times 6.678$, or the reduction for $6^h 40^m 40^s$ in Table III .	+	1	5.82	
The sidereal time of local mean noon	3	30	46.07	
The given sidereal time ($+ 24^h$, if necessary for the following subtraction) .	24	36	37.16	
Subtracting the first from the second gives the sidereal interval from noon .	21	5	51.09	$=21^h.097525$
$-9^s.8296 \times 21.097525$, or the reduction for $21^h 5^m 51^s.09$ in Table II . .	—	3	27.38	
The required astronomical mean time is . . . May 14,	21	2	23.71	

Page III contains, for Greenwich mean noon of each day, *The Sun's True Longitude* and *Latitude*, and the *Logarithm of the Radius Vector of the Earth.* The longitudes of the sun are the true longitudes, not affected by aberration. The longitude is given in two columns, headed λ and λ'; λ representing the sun's longitude counted from the true equinox of the date; and λ', the same co-ordinate counted from the mean equinox of the beginning of the year, (January $0^d.0$). A column of hourly differences enables the computer to obtain the sun's longitude for any hour from noon. The hourly differences of the logarithm of the radius vector are likewise given. The latitude is referred to the ecliptic of the date.

The last column on page III contains the *Mean Time of Sidereal Noon;* that is, the number of hours, minutes and seconds after Greenwich mean noon when the first point of Aries passes the meridian of Greenwich. It may be reduced to any meridian by interpolating for the longitude, or to any Greenwich sidereal time by means of the hourly difference, $-9^s.8296$. The reduction, however, can be taken directly from Table II for reducing intervals of sidereal time to mean solar time; or, approximately, from Table LII Bowditch's *Navigator.*

This column may be used in converting sidereal time to mean time instead of that on page II. As an illustration, let us take Example 3, above.

It is seen in advance that the sum of the mean time of sidereal noon and the given sidereal time is less than 24 hours. Were it more than 24 hours, the mean time of sidereal noon should be taken out for May 13, that is the preceding astronomical day.

	h	m	s	
May 14, the mean time of Greenwich sidereal noon is . .	20	26	58.19	
The H. D. $-9^s.8296 \times 6.678$, or the reduction for long., Table II	—	1	5.64	
The mean time of local sidereal noon	20	25	52.55	
Add the given sidereal time	0	36	37.16	$=0^h.6103$
The sum is	21	2	29.71	
$-9^s.8296 \times 0.6103$, or the reduction for $0^h 36^m 37^s.2$ in Table II .	—	0	6.00	
The required astronomical mean time . May 14,	21	2	23.71	

Page IV contains *The Moon's Semidiameter* and Equatorial *Horizontal Parallax*, for each mean noon and midnight at Greenwich. Columns adjoining those of the horizontal parallax give the change of this quantity in one hour, by means of which it can be reduced to any other Greenwich mean time, in the same way as the sun's declination and the equation of time in the preceding examples. The sign plus or minus prefixed to the hourly differences, shows whether the horizontal parallax is increasing or decreasing.

The reduction of the moon's semidiameter may be readily found by multiplying the reduction of the horizontal parallax by 0.272. It may also be obtained from Table XI of BOWDITCH's *Navigator*, or by simply computing the proportional part.

If, for example, the semidiameter of the moon is to be taken out for 1889, May 21, 10^h, P. M., Greenwich mean time, we see that the difference of the semidiameters at noon and midnight of May 21 is $6''.7$; then,

$$\text{as } 12^h : 10^h = 6''.7 : 5''.6,$$

which is the correction to be subtracted from the semidiameter at noon, because the semidiameter is decreasing. The moon's semidiameter then, for May 21, 10^h, is $15' \; 52''.4 - 5''.6$, or $15' \; 46''.8$.

The moon's semidiameter and horizontal parallax are required for all observations of the moon. When great precision is needed, the hourly differences should be first interpolated for half the interval of Greenwich time from noon or midnight, and a correction applied to the horizontal parallax for the latitude of the place of observation.

The *Mean Time of the Moon's Upper Transit at Greenwich*, which is given on page IV to tenths of a minute, is also accompanied with a column of differences for one hour of longitude, by means of which, having the longitude converted into time, the local time of the moon's meridian passage at any other place, may be computed. The reduction may be taken by simple inspection from BOWDITCH's Table XXVIII. The last column of this page contains the *Age* of the moon, or the time elapsed since the preceding new moon, to tenths of a day.

Pages V—XII contain *The Moon's Right Ascension*, and *Declination*, for each day and hour of Greenwich mean time. They are accompanied with columns of differences for one minute, which are also given at each hour. The Greenwich mean time, which is required for taking out these quantities, may be taken from a well-regulated chronometer, or obtained by applying the longitude converted into time, to the local mean time of the observer. The right ascension or declination is taken out for the day and hour of the Greenwich mean time; the *Diff. for 1 Minute* multiplied by the minutes and parts of a minute of the Greenwich time, and the product added to, or subtracted from the quantity, according as the quantity is increasing or decreasing.

Thus, suppose the moon's right ascension and declination are required for 1889, May 1, $10^h \; 10^m \; 30^s$, astronomical mean time at Greenwich:—

	Right Ascension.		*Declination.*
	h m s		° ′ ″
May 1, 10^h	4 2 31.50		N. 17 15 21.9
Diff. $2^s.0154 \times 10.5$ . . =	+ 21.16	$7''.763 \times 10.5$ =	+ 1 21.5
May 1, $10^h \; 10^m \; 30^s$	4 2 52.66		N. 17 16 43.4

The differences interpolated for $5^m.2 = 0^h.09$ are, for the right ascension $2^s.0156$, and for the declination $7''.756$, which may be used for greater precision.

Page XII contains also the *Phases of the Moon* and the dates of the *Moon's Perigee and Apogee*, or least and greatest distances from the earth.

Pages XIII—XVIII contain the *Lunar Distances*, or the angular distances of the centre of the moon from the centre of the sun, and from the four larger planets and certain fixed stars, as they would appear to an observer at the centre of the earth. They are given for every third hour of Greenwich mean time, beginning at noon; the dates are therefore astronomical. All the distances that can be observed on the same day, are grouped together under that date; and the columns are read from left to right, across both pages of the same opening. The letter W. or E. is affixed to the name of the sun, planet or star, to indicate that it is on the west, or east side of the moon.

An observer on the earth's surface having measured a lunar distance, corrected it for errors of his instrument and for the semidiameter of the objects, and cleared it from the effects of refraction and parallax, finds the true or geocentric distance, that is, the distance as it would have appeared from the centre of the earth at the moment of observation. With this distance and the distances in the Ephemeris of the same bodies on the same day, the Greenwich mean time of the observation can be found.

To lessen the labor of computation, there is given in the Ephemeris, between every two successive distances, the logarithm of the seconds of time in which the distance changes 1″; or, as it is usually called, the *Proportional Logarithm of the Difference.* It is given for the middle instant of the two hours between which it is placed.

For computing the Greenwich time we have the following rule:—

Find in the Almanac the two distances between which the true distance falls; take out the nearer of these, the hours of Greenwich time over it, and the P. L. of Diff. between them.

Find the difference between the true distance and the distance taken from the Almanac; and from the proportional logarithm of this difference, as found in the Navigator, subtract the P. L. of Diff. taken from the Almanac.

The result is the proportional logarithm of an interval of time to be added to the hours of Greenwich time, taken from the Almanac, when the earlier Almanac-distance is used; to be subtracted from the hours of Greenwich time, when the later Almanac-distance is used.

Another method is, to add the common logarithm of the difference of the true and the Almanac-distances to the P. L. of Diff. of the Almanac; the sum will be the common logarithm of the correction to be applied to the hours of Greenwich time. The Table of *Logarithms of small Arcs in Space or Time,* given at the end of the volume for 1871, saves the operation of reducing degrees (or hours) and minutes to seconds, and the reverse.

As the P. L. of Diff. in the Ephemeris varies, the Greenwich time found by the methods just described may not be sufficiently exact. To correct it for such variation, or second difference, take the difference between the P. L. of Diff. used and the one which follows it in the Ephemeris, (or, more strictly, half the difference of the preceding and following ones). With this difference, and the first correction of the Greenwich time already found, enter Table I, appended to this volume, and take out the corresponding seconds, which are to be added to the approximate Greenwich time when the Prop. Logs. in the Ephemeris are decreasing; and subtracted when they are increasing.

Thus the Greenwich mean time of the observation can be obtained. If the observer has noted the time of observation by a chronometer, the difference of this chronometer-time and the Greenwich mean time will be the error of the chronometer on Greenwich time as found from the lunar distance. In this way lunar distances can be used as a check upon the chronometer. By a series of carefully observed lunar distances on both sides of the moon, the chronometer-error may generally be ascertained within 20 or 30 seconds.

If the observer has found the local mean time of observation from the observed altitude of one of the bodies, or by a watch regulated to that time by recent observations and corrected for change of longitude in the interval, the difference of this local time and the Greenwich time found from the lunar distance will be his longitude. A longitude derived by this method should always be considered as uncertain by 5′ or more.

As an example of finding the Greenwich mean time from a lunar distance, suppose that in 1889, May 12, the corrected distance of the moon's centre from that of Antares is 46° 12′:—

Corrected distance	46° 12′ 0″		
Distance in Ephemeris May 12, XV^h	46 31 33	P. L.	0.2278
Difference	0 19 33	P. L.	0.9641
	h m s	P. L.	0.7363
Time from XV^h (*after*)	+0 33 2		
Corr. for 2d Diff., Table I	+ 2		
Greenwich mean time May 12	15 33 4		

By a table of common logarithms, or a table of logarithms of small arcs, the reduction of the Greenwich time would be found thus: —

From Ephemeris	P.L.	0.2278
Diff. of distances, 19′ 33″ = 1173″	log	3.0693
Red. of Greenwich time, 1982^s = 0^h 33^m 2^s	log	3.2971

The result is the same as by the previous method.

Pages 218—249 contain the geocentric ephemerides of the seven major planets. The positions are referred to the equator and true equinox of the date, and corrected for aberration; they are, therefore, apparent positions. All the data except meridian passage are given for the moment of Greenwich mean noon. The column *Meridian Passage* gives the hour, minute and tenth of that passage of the planet over the meridian of Greenwich which occurs next after the noon of the date.

The right ascension and declination of a planet are required whenever it has been observed for time, latitude or azimuth. The mode of reducing them to any instant of Greenwich mean time is the same as in the examples for the sun, previously given. The local mean time of passage across any other meridian can be found by dividing the daily differences by 24, and multiplying the quotient by the hours and fractions of the longitude of the place. The product is subtractive from the time of Greenwich passage when the place is east of Greenwich, and additive when west. The corrections can never exceed one-half the change for one day.

Pages 250—263 contain the heliocentric positions of the seven major planets, and the logarithms of their distances from the earth. The heliocentric longitude is reckoned, not from the true equinox, as in the preceding ephemerides, but from the mean equinox of the date. It is, therefore, necessary to apply nutation, if the longitude from the true equinox is required. The daily motion is given for the moment of Greenwich mean noon. The column *Reduction to Orbit* gives the correction to be applied to the heliocentric longitudes in order to obtain the longitude counted along the orbit of the planet. This longitude is equal to the distance of the node from the mean equinox, plus the distance of the planet from the node. The heliocentric latitude is counted from the moving plane of the ecliptic. The *Logarithm of Radius Vector* is the logarithm of the distance of the centre of the planet from that of the sun, at each Greenwich mean noon given in the first column. The last two columns give, in the same way, the logarithm of the true distance of the centre of the planet from that of the earth. The one column gives the quantity for the Greenwich noon indicated on the left hand side of the page, and the other for the noon which is midway between that date and the date next below it. In the case of Mercury, this intermediate date is mean noon of the day immediately following; in the case of Venus, Mars, Jupiter, and Saturn, it is mean noon of the second day following; and in the case of Uranus and Neptune, mean noon of the fourth day following.

Pages 264—271 contain the rectangular co-ordinates of the centre of the sun, referred to the centre of the earth as the origin, and to the true equator and equinox of each date as the circle and point of reference. Each co-ordinate is given first for Greenwich mean noon, and in the column following for mean midnight of the same day. The columns *Reduc. to Mean Eq'x of Jan.* 0 give the corrections to be applied to the co-ordinates for noon in order to obtain the corresponding co-ordinates referred to the mean equator and the mean equinox of January 0.

Pages 272—275 give the longitude and latitude of the moon for every Greenwich mean noon and midnight. Both quantities are referred to the true ecliptic and equinox of the date.

Pages 276 and 277 contain the position of the moon's equator and the mean longitude of the moon, and a table for computing the libration of the moon. The epochs of greatest libration of the moon, together with the formulæ for finding the libration in longitude and latitude are given on page 419.

Page 278 contains, for each tenth Greenwich mean noon, the values of the principal elements arising from the motion of the equinox, and also the aberration and parallax of the sun. The column *Apparent Obliquity of the Ecliptic* (HANSEN) gives the true inclination of the earth's equator to the ecliptic, without correction for the terms depending on the moon's longitude. The *Equation of Equinoxes* is really the astronomical nutation; that given *In Longitude* is the correction to be applied to the longitude of the body referred to the mean equinox, in order to obtain that longitude as referred to the true equinox. When the correction is positive, the true longitudes are greater than those referred to the mean equinox; while the contrary is true when the correction has the negative sign. The equation *In R. A.* is equal to that in longitude, multiplied by the cosine of the obliquity of the ecliptic.

The next column gives the *Precession of Equinoxes in Longitude*, from January 0 to each of the dates following. *The Sun's Aberration* is the quantity which is to be applied to the true longitude of the sun in order to obtain its apparent longitude. The correction being negative shows that the apparent longitude as affected by aberration is always less than the true longitude. The *Sun's Equatorial Horizontal Parallax*, given in the next column, is the angle subtended by the radius of the earth's equator, as seen from the centre of the sun.

PART II—THE EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.

Page 280 contains the formulæ for reducing the positions of the fixed stars, using the notation of Bessel, and the constants of Peters and Struve. The formulæ by which the star-numbers are computed are also given.

Pages 281—284 contain the logarithms of the *Besselian Star-Numbers*, *A*, *B*, *C*, *D*, for each Washington mean midnight. These numbers serve to reduce the mean place of a star at the beginning of the Besselian fictitious year to its apparent place at the dates for which the numbers are given. If used in accordance with the English and French notation, the pair of quantities *A* and *B* must be interchanged with the pair *C* and *D*; that is, *A* must be interchanged with *C*, and *B* with *D*. In the first column along with the solar day is given, for certain dates, the sidereal hour and tenth of midnight. The sidereal time for which any set of quantities is given can be found by interpolation from these numbers.

The following is an example of the reduction of a star to apparent place by the Besselian star-numbers: —

Computation of the apparent place of α *Bootis for* 1889, *Nov.* 4, *for the upper transit at Washington.*

(Star-Catalogue)	log a	0.4492	log b	8.3046 *n*	log c	8.7756 *n*	log d	8.5823 *n*
(Page 284)	log A	9.6790	log B	9.8500	log C	1.1341	log D	1.1482
(Star-Catalogue)	log a'	1.2275 *n*	log b'	9.7320	log c'	9.7714	log d'	9.4543 *n*
	log Aa	0.1282	log Bb	8.1546 *n*	log Cc	9.9097 *n*	log Dd	9.7305 *n*
	log Aa'	0.9065 *n*	log Bb'	9.5820	log Cc'	0.9055	log Dd'	0.6025 *n*

Mean Place, 1889.0, (page 298)	$\alpha_0 =$	14h 10m 35s.919	$\delta_0 =$	+19° 45′ 37″.98
	$Aa =$	+ 1.343	$Aa' =$	− 8.06
	$Bb =$	− 0.014	$Bb' =$	+ 0.38
	$Cc =$	− 0.812	$Cc' =$	+ 8.04
	$Dd =$	− 0.537	$Dd' =$	− 4.00
	$E =$	− 0.003	$\tau\mu' =$	− 1.68
	$\tau\mu =$	− 0.065		
Apparent Place, 1889, *Nov.* 4,	$\alpha =$	14 10 35.831	$\delta =$	+19 45 32.66

Pages 285—292 contain the *Independent Star-Numbers*, which can be used for the same purpose. The column τ gives the fraction of the year from the beginning of the fictitious year to each date. These quantities are connected with those of Bessel by the relations given on page 280, where are also found the formulæ and precepts for the application of both systems of numbers. In order to use the Besselian numbers, it is necessary to have the values of the star-constants, a, b, c, d, a', b', c', d'. The independent star-numbers are given in order that the apparent place of the star may be determined when it is not convenient to compute these numbers.

The following is an example of the reduction of a star to apparent place by the independent star-numbers:—

Computation of the apparent place of α Bootis for 1889, *Nov.* 4, *for the upper transit at Washington.*

$\alpha_0 = 212^\circ\ 39'$ $\delta_0 = +19^\circ\ 45'.6$

$G = 4^\circ\ 13'.7$ $G + \alpha_0 = 216^\circ\ 52'.7$

$H = 44\ \ 4$ $H + \alpha_0 = 256\ \ 43.$

$\log \frac{1}{15}$	8.8239	$\log \frac{1}{15}$	8.8239	$\alpha_0 =$	$14^h\ 10^m\ 35^s.919$
$\log g$	0.9824	$\log h$	1.2918	$f =$	$+\ 1.464$
$\log \sin (G+\alpha_0)$	9.7782 *n*	$\log \sin (H+\alpha_0)$	9.9882 *n*	$(g) =$	$-\ 0.138$
$\log \tan \delta_0$	9.5554	$\log \sec \delta_0$	0.0264	$(h) =$	$-\ 1.350$
$\log (g)$	9.1399 *n*	$\log (h)$	0.1303 *n*	$\tau \mu =$	$-\ 0\ 065$
		Apparent R. A.,		$\alpha =$	$14\ 10\ 35.830$

$\log g$	0.9824	$\log h$	1.2918	$\delta_0 =$	$+\ 19^\circ\ 45'\ 37''.98$
$\log \cos (G+\alpha_0)$	9.9030 *n*	$\log \cos (H+\alpha_0)$	9.3613 *n*	$(g') =$	$-\ 7.68$
$\log (g')$	0.8854 *n*	$\log \sin \delta_0$	9.5290	$(h') =$	$-\ 1.52$
		$\log (h')$	0.1821 *n*	$(i) =$	$+\ 5.56$
				$\tau \mu' =$	$-\ 1.68$
$\log i$	0.7714	*Apparent Dec.*,		$\delta =$	$+\ 19\ 45\ 32.66$
$\log \cos \delta_0$	9.9736				
$\log (i)$	0.7450				

Pages 293—301 contain the mean places of three hundred and eighty-three stars, for the beginning of the fictitious year 1889, or the moment when the sun's mean longitude is 280°.

The annual variations are to be considered as the differential coefficients of each co-ordinate with respect to the time at the beginning of the year.

In order that the list of mean places of stars may serve the purpose of a working-catalogue for the convenient use of astronomers, the position of each of the northern circumpolar stars is given in duplicate, one position being for the upper and the other for the lower culmination. The positions for the lower culmination are marked S. P. In this case, the right ascensions are the sidereal times at which the star crosses the lower meridian; and, in order to have the expressions for the co-ordinates congruous in all cases, the declinations are counted from the equator through the north pole, and therefore exceed 90°. The time of observation and setting of the circle, in order to find a star on the meridian, are then obtained uniformly for all the stars.

Beginning with the volume of 1882, the number of stars has been greatly increased, in order to make the list more useful to field-astronomers. In order to show at a glance these additional stars, they are indicated in the list by an asterisk.

Pages 302—313 contain the apparent positions of the four north polar stars, *α*, *δ* and *λ* Ursæ Minoris, and 51 Cephei, for every upper transit at Washington. They include the terms depending on the moon's longitude. The mean solar time of transit is given in the column *Mean Solar Date*, in order that each transit above and bolow the pole may be readily identified. Suppose, for example, that the transit of Polaris below the pole on January 26th is to be found. and we wish to know whether it precedes or follows the upper transit of the same date. On page 302, we find that the upper transit occurs January 26.2; the lower transit, therefore, occurs January 26.7. But, the lower transit following that of July 1st (page 308), does not take place until July 2.3. Hence, the lower transit of July 1st precedes the upper one of the same date. A transit occurring very nearly at noon may also be identified without a computation to ascertain the actual mean date, by simply noting the tenth of a day in the column of *Mean Solar Date.*

Pages 314—364 contain, for every tenth upper transit at Washington, the apparent places of those stars of the preceding list which are not marked with an asterisk. The mean solar date in each left hand column gives the day and tenth of the transit; so that each intermediate transit may be readily identified. Along with each co-ordinate is given, in small type, the change for ten days. This quantity is to be regarded as the differential coefficient corresponding to the dates for which the star-places are given.

Pages 365—376 contain the apparent right ascensions of all stars marked with an asterisk in the list of mean places. The apparent right ascension of each star is given only for that part of the year when it may readily be observed on the meridian. In the case of circumpolar stars, the right ascensions for lower, as well as upper, transit are given.

Pages 377—384 contain the apparent right ascension, declination, and semidiamter of the sun, and the sidereal time, all for Washington mean noon. Adjoining columns give the seconds of right ascension and of declination for apparent noon, that is, for the moment of transit of the sun's centre over the meridian of Washington. The hours and minutes of right ascension, and the degrees and minutes of declination are the same for both mean and apparent noon. In case they would have differed, the minute which would have been numerically larger is diminished by one, and the seconds increased by sixty, so that there is always a correspondence between the two numbers. The hourly motions in right ascension and declination are given for the moment of mean noon, but may be regarded as having the same values for apparent noon.

The *Equation of Time for Apparent Noon* is the correction to be applied to apparent time in order to obtain mean time. It is, therefore, mean time minus apparent time. Each number as given is the mean time of transit of the sun's centre over the meridian of Washington, counted from the nearest noon. The use of all the quantities is substantially the same as in the *Ephemeris for the Meridian of Greenwich.*

Pages 385—392 contain the right ascension, declination, semidiameter, and parallax of the moon, at the moment of transit over the meridian of Washington. The mean time given in the second column is that of transit of the moon's centre over this meridian. The differences for one hour of longitude are the amounts by which the local mean times of transit over a meridian one hour west of Washington exceed those given in the column *Mean Time of Transit,* supposing the rate of change to be uniform and equal to what it is at the moment of transit over the meridian of Washington. The next four columns need no especial explanation, except that the differences for one hour of longitude are computed as if the motion of the moon in right ascension were uniform. By means of them, the position of the moon can be computed with astronomical accuracy at the moment of transit over any meridian not exceeding one hour in longitude from that of Washington, by taking account of second differences. With greater longitudes of the place, the accuracy of the result obtained in this way will diminish. The columns of sidereal time of semidiameter passing meridian, etc., do not seem to need any explanation, except that they all refer to the moment of transit. The column *Bright Limbs* is given to indicate to the observer which limbs are illuminated. When two opposite limbs are both so nearly full that they can be well observed, both are indicated; and the one which is deficient is printed in smaller type. When the illumination is so nearly equal that no choice can be made between them, both are printed in large type.

Pages 393—408 contain the geocentric apparent right ascensions and declinations of six of the major planets (Mars not being observable at transit), and their semidiameters and horizontal parallaxes, for the moments of all those transits over the meridian of Washington which can be observed.

PART III—PHENOMENA.

This portion of *The American Ephemeris and Nautical Almanac* gives the principal astronomical phenomena of the year, reduced to Washington mean time, except in the case of the eclipses and the data for the rings of Saturn, which are given in Greenwich mean time.

Pages 410—418 inclusive contain the elements necessary for computing the eclipses of the sun which occur during the year.

The eclipse-elements are given for the moment of conjunction of the sun and moon in right ascension. The subsequent tables and results are not, however, computed from these elements unchanged; but from the accurate positions of the two bodies as interpolated for each hour of the eclipse. The principal circumstances of each eclipse are as follow:—

On the line "Eclipse begins" is given the Greenwich mean time at which the earth first touches the moon's penumbra, and the longitude and latitude of the point of touching.

The "Central eclipse begins" when the axis of the moon's shadow first touches the earth, and the longitude and latitude of the point of touching follow.

"Central eclipse at noon" indicates the moment when the axis of the shadow is coincident with the plane of the meridian at the point of its intersection with the earth's surface. To the observer at this point, the eclipse will be central at the moment of apparent noon.

"Central eclipse ends" and "Eclipse ends" have the converse meaning of the beginning.

Maps of the Eclipses.—The regions in which each eclipse is visible, are shown upon the maps given in connection with them. From these maps may also be derived the approximate determination of the times of beginning and ending, and of the magnitude of the eclipses at any place. The dotted curves show the outlines of the shadow for each hour of Greenwich mean time and therefore pass through all the places where the eclipse begins or ends at that hour. To find at what hour the eclipse begins at any place, we determine by inspection between what pair of these curved lines the place is situated. The eclipse will then begin between these two hours of Greenwich mean time: the fraction of the hour may be determined by dividing the hour proportionally to the space which it represents on the map. This division may be a little more exact by allowing for the changes in this space as indicated by their varying width. The Greenwich mean time thus found must be reduced to local mean time by applying the longitude.

As an example, suppose we wish to find the time at which the eclipse of 1889, Jan. 1, begins at San Francisco, Cal.

We compare the distance of the place from the curves of 8^h and 9^h and we find it to correspond to about 20 minutes, therefore the time of beginning is approximately 8^h 20^m, which is probably correct to within 2 or 3 minutes. Changing to local mean time the result will be:—

			h	m
Greenwich mean time	Jan. 1,		8	20
Longitude West	.	—	8	9.6
Local mean time	1,		0	10.4

In the case of total and annular eclipses, a rough estimate of the magnitude of the eclipse may be obtained from the position of the place relatively to the central line and to the limit. On the central line, the eclipse is annular or total, while on the limit, the limb of the moon only grazes that of the sun.

More Accurate Computations.—A more accurate determination of the phases as visible at any point of the earth's surface may be obtained from the Besselian elements which are given for every ten minutes of Greenwich mean time. Their geometric signification is as follows:—

Let us imagine a plane passing through the centre of the earth, perpendicular to the right line joining the centres of the sun and moon. This latter line is the axis of the moon's shadow, and the plane is called the *fundamental plane*. We take the intersection of this plane with that of the earth's equator as the axis of X, and the centre of the earth as the origin of co-ordinates. The axis of Y is perpendicular to that of X, and directed toward the north; x and y are then the co-ordinates of the point in which the axis of the shadow intersects the fundamental plane. The angle d, of which the sine and cosine are both given, is the declination of that point of the celestial sphere toward which the axis of the shadow is directed; this direction being that from the earth toward the moon and sun. The angle μ is the Greenwich hour-angle of this same point of the celestial sphere.

The quantities l and l' are the radii of the shadow-cones upon the fundamental plane, l corresponding to the penumbra, and l' to the umbra, or annulus. The notation is that of CHAUVENET's *Spherical and Practical Astronomy*, in which l' is regarded as positive for an annular, and negative for a total eclipse.

The angles f and f', the tangents of which are given, are the angles which the elements of the respective shadow-cones make with the axis of the shadow; or, they are the semi-angles of the two cones.

At the bottom of the table are given the logarithms of the change of x, y and μ, in one minute, in order to facilitate the interpolation to any required moment.

The method of computing the eclipse from the given elements is as follows: It is premised that the moments of beginning and ending are those at which the distance of the observer from the axis of the shadow or penumbra is equal to the radius of the latter at the point of observation. To find such distance and radius we compute—

(1) The co-ordinates, ξ, η and ζ, of the observer, at some assumed moment of Greenwich mean time, as near as practicable to the true time of the required phase, together with their variations for one minute.

(2) The co-ordinates x and y of the axis of the shadow at the same moment, which, with their variations for one minute, are taken from the tables of elements.

(3) Hence, the position and motion of the observer relative to the axis of the shadow.

(4) The radius of the penumbra or umbra at a distance from the fundamental plane equal to that of the observer.

(5) Then, assuming the motions to be uniform, we determine the time required for the observer to be brought to a distance from the axis of the shadow equal to this radius.

The formulæ and directions for the several steps in the computation are as follow:—

(1) Find the geocentric co-ordinates of the station referred to the earth's equator, which are represented by $\rho \cos \varphi'$ and $\rho \sin \varphi'$, ρ being the distance from the centre of the earth, and φ' the geocentric latitude. These may be obtained from geodetic tables, or may be computed from the following table by the formulæ—

$$\rho \cos \varphi' = F \cos \varphi$$

$$\rho \sin \varphi' = \frac{\sin \varphi}{G}$$

φ being, as usual, the geographic latitude.

Table for Computing the Geocentric Co-ordinates of a Place.

φ	Log F.		Log G.	
0°	0.00000		0.00302	
5	0.00001	1	0.00300	2
10	0.00005	4	0.00297	3
15	0.00010	5	0.00292	5
20	0.00018	8	0.00284	8
25	0.00027	9	0.00275	9
30	0.00038	11	0.00264	11
35	0.00050	12	0.00252	12
40	0.00062	12	0.00239	13
45	0.00075	13	0.00226	13
50	0.00088	13	0.00213	13
55	0.00101	13	0.00201	12
60	0.00113	12	0.00189	12
65	0.00124	11	0.00178	11
70	0.00133	9	0.00169	9
75	0.00141	8	0.00161	8
80	0.00146	5	0.00155	6
85	0.00150	4	0.00152	3
90	0.00151	1	0.00151	1

For the assumed Greenwich mean time of computation, take from the table of elements the values of $\sin d$, $\cos d$, and μ. Put:

λ, the longitude west from Greenwich. The co-ordinates of the observer will then be:—

$$\xi = \rho \cos \varphi' \sin (\mu - \lambda)$$
$$\eta = \rho \sin \varphi' \cos d - \rho \cos \varphi' \sin d \cos (\mu - \lambda)$$
$$\zeta = \rho \sin \varphi' \sin d + \rho \cos \varphi' \cos d \cos (\mu - \lambda)$$

and their variations in one minute of mean time will be:—

$$\xi' = [7.63992]\, \rho \cos \varphi' \cos (\mu - \lambda)$$
$$\eta' = [7.63992]\, \rho \cos \varphi' \sin d \sin (\mu - \lambda) = [7.63992]\, \xi \sin d$$

ζ' is not wanted.

(2) The co-ordinates x and y of the axis of the shadow are taken from the tables of elements for the same assumed moment of Greenwich mean time, together with their variations for one minute, which are equal to one-tenth of the differences of two consecutive numbers. The variations for one minute we represent by x' and y'. Their logarithms are given at the foot of the tables.

(3) The distance m and position-angle M of the axis of the shadow relative to the observer, and the relative motions, n and N, are computed by the formulæ:—

$$m \sin M = x - \xi$$
$$m \cos M = y - \eta$$
$$n \sin N = x' - \xi'$$
$$n \cos N = y' - \eta'$$

(4) The radius L of the shadow or penumbra at the distance ζ from the fundamental plane is computed by the formula

$$L = l - \zeta \tan f$$

l and f being found in the table of elements, and ζ computed in (1).

(5) If the time chosen for computation is exactly that of the beginning or end of the eclipse, we shall have—

$$m = L$$

But, as this condition can scarcely ever be fulfilled on a first trial, a correction τ to the assumed time is computed thus: Find the angle ψ from the equation,

$$\sin \psi = \frac{m \sin (M - N)}{L}$$

There will be two values to this angle, of which one will be in the first and the other in the second quadrant when $\sin \psi$ is positive, and one in the third and the other in the fourth when $\sin \psi$ is negative. But, simplicity will be gained by taking only that value of ψ for which $\cos \psi$ is positive. This value lies between the limits $+ 90°$ and $- 90°$. The correction τ to the assumed time will be found in minutes, from—

For beginning: $$\tau = - \frac{m \cos (M - N)}{n} - \frac{L \cos \psi}{n}$$

For ending: $$\tau = - \frac{m \cos (M - N)}{n} + \frac{L \cos \psi}{n}$$

One such pair of values of τ cannot, however, give the times of both beginning and ending with accuracy. To attain accuracy we must, in commencing the computation, assume two times, one as near as practicable to that of beginning, and another near that of ending. These approximate times may be derived from the chart of the eclipse. We shall thus have two pairs of values of τ. The computation for the first assumed time will give a small and nearly correct value for the beginning of the eclipse, and a large value which, added to the assumed time, will give an inaccurate time of ending. The computation for the second assumed time will give a small and nearly correct value for the end, and a large negative and inaccurate one for the beginning. We shall thus deduce two times of beginning and two of ending, of each of which only one is to be considered approximately correct.

The more accurate times of beginning and ending may now be taken in place of the first assumed ones, and the computation may be repeated from the beginning, leading to a pair of values of τ, which should be very small and accurate. Such a repetition of the computation will in general be advisable, to guard against accidental numerical errors. The following theorem will, however, enable us to obtain a second approximation to the true times of each phase without repeating the computation.

THEOREM.—*The error of each result is approximately proportional to the square of the correction* τ, *multiplied by the sine of the sun's hour-angle*, $(\mu-\lambda)$, *for the middle of the interval between the time of computation and that of the phase.*

To apply this theorem we find the two values of $\tau^2 \sin(\mu-\lambda)$ corresponding to the required phase. We then find the ratio of these quantities—which will commonly be a large number, and divide the difference of the results by this ratio. The quotient will be a correction to be applied to the more accurate result in such a way as to make it deviate yet more from the less accurate one. This correction should be positive in the local forenoon, and negative in the afternoon, and its value should never materially exceed $0^m.001\ \tau^2$.

Unless the times chosen for computation are unusually in error, say ten minutes or more, the corrected results thus obtained will be theoretically correct within less than a second. But to guard against numerical errors it is better, after making this final correction, to repeat the computations so far as to obtain new values of m and L for the corrected times. If these two quantities agree within a unit of the fourth place of decimals, the times employed are generally correct within a second of time. If they differ too widely, further corrections and computations may be made by the computer according to his own judgment.

It may be remarked that the uncertainty of the ephemerides is such that a prediction may be several seconds in error from this unavoidable cause alone.

Position-angle of Point of Contact.—The position-angle P, of the point of contact, reckoned from the north point of the sun's limb toward the east, is found by the formula

For beginning: $P = N - \psi \pm 180°$
For end: $P = N + \psi$

it being assumed that, in each case, the value of ψ is taken between the limits ± 90°.

Computation of the Solar Eclipse of 1889, *January* 1, *for Point Arena, Cal.*

Latitude, $\varphi = +\ 38° 57' 10''$
Longitude, $\lambda = +\ 123\ 44\ 42$

Constants for the given place:—

$\rho \sin \varphi' = 9.79609$
$\rho \cos \varphi' = 9.89136$

From the Eclipse Charts we find the approximate times of the phases as follow:—

	h	m	
Beginning	8	20	Greenwich Mean Time.
Total phase	9	45	
Ending	11	10	

	Beginning.	Total phase.	Ending.
Greenwich Mean Time,	$8^h\ 20^m$	$9^h\ 45^m$	$11^h\ 10^m$
μ	123° 57′ 18″	145° 12′ 3″	166° 26′ 48″
λ	123 44 42	123 44 42	123 44 42
$\mu-\lambda$	0 12 36	21 27 21	42 42 6
$\rho \cos \varphi'$	9.89136	9.89136	9.89136
$\sin(\mu-\lambda)$	7.56409	9.56322	9.83134
$\log \xi$	7.45545	9.45458	9.72270
ξ	+ 0.002854	+ 0.28483	+ 0.52808

		Beginning.	Total phase.	Ending.
Greenwich Mean Time,		$8^h\ 20^m$	$9^h\ 45^m$	$11^h\ 10^m$
	$\rho \sin \varphi'$	9.79609	9.79609	9.79609
	$\cos d$	9.96422	9.96423	9.96425
		9.76031	9.76032	9.76034
	(1)	+ 0.57585	+ 0.57586	+ 0.57588
	$\rho \cos \varphi'$	9.89136	9.89136	9.89136
	$\sin d$	9.59080 *n*	9.59064 *n*	9.59061 *n*
	$\cos (\mu - \lambda)$	9.99999	9.96881	9.86623
		9.48216 *n*	9.45081 *n*	9.34820 *n*
	(2)	− 0.30350	− 0.28237	− 0.22295
(1)−(2)	η	+ 0.87935	+ 0.85823	+ 0.79883
	$\rho \sin \varphi'$	9.79609	9.79609	9.79609
	$\sin d$	9.59080 *n*	9.59064 *n*	9.59061 *n*
		9.38689 *n*	9.38673 *n*	9.38670 *n*
	(3)	− 0.24372	− 0.24363	− 0.24361
	$\rho \cos \varphi'$	9.89136	9.89136	9.89136
	$\cos d$	9.96422	9.96423	9.96425
	$\cos (\mu - \lambda)$	9.99999	9.96881	9.86623
		9.85557	9.82440	9.72184
	(4)	+ 0.71710	+ 0.66741	+ 0.52704
(3)+(4)	ζ	+ 0.47338	+ 0.42378	+ 0.28343
	const. log	7.63992	7.63992	7.63992
	$\rho \cos \varphi' \cos (\mu - \lambda)$	9.89135	9.86017	9.75759
	$\log \xi'$	7.53127	7.50009	7.39751
	ξ'	+ 0.003398	+ 0.003163	+ 0.002496
	const. log	7.63992	7.63992	7.63992
	$\xi \sin d$	7.04625 *n*	9.04522 *n*	9.31331 *n*
		4.68617 *n*	6.68514 *n*	6.95323 *n*
	η'	− 0.0000048	− 0.0004843	− 0.0008979
	x	− 0.53712	+ 0.27802	+ 1.09310
	ξ	+ 0.00285	+ 0.28483	+ 0.52808
	$x - \xi$	− 0.53997	− 0.00681	+ 0.56502
	y	+ 0.86613	+ 0.85754	+ 0.85041
	η	+ 0.87935	+ 0.85823	+ 0.79883
	$y - \eta$	− 0.01322	− 0.00069	+ 0.05158
	x'	+ 0.00959	+ 0.00959	+ 0.00959
	ξ'	+ 0.003398	+ 0.003163	+ 0.002496
	$x' - \xi'$	+ 0.006192	+ 0.006427	+ 0.007094
	y'	− 0.000093	− 0.000087	− 0.000081
	η'	− 0.0000048	− 0.000484	− 0.000898
	$y' - \eta'$	− 0.0000882	+ 0.000397	+ 0.000817
	$m \sin M$	9.73236 *n*	7.83315 *n*	9.75207
	$m \cos M$	8.12123 *n*	6.83885 *n*	8.71248
	$\tan M$	1.61113	0.99430	1.03959

		Beginning.	Total phase.	Ending.
Greenwich Mean Time,		$8^h\ 20^m$	$9^h\ 45^m$	$11^h\ 10^m$
	M	268° 35′ 51″	264° 12′ 52″	84° 47′ 3″
	$\cos M$	8.38874 *n*	9.00348 *n*	8.95860
	$\log m$	9.73249	7.83537	9.75388
	$n \sin N$	7.79183	7.80801	7.85089
	$n \cos N$	5.94547 *n*	6.59879	6.91222
	$\tan N$	1.84636 *n*	1.20922	0.93867
	N	90° 48′ 58″	86° 27′ 55″	83° 25′ 50″
	$\cos N$	8.15361 *n*	8.78996	9.05845
	$\log n$	7.79186	7.80883	7.85377
	$\log \frac{m}{n}$	1.94063	0.02654	1.90011
	$\tan f$	7.67719	7.67508	7.67719
	$\log \zeta$	9.67521	9.62714	9.45244
		7.35240	7.30222	7.12963
	$\zeta \tan f$	0.002251	0.002005	0.001348
	l	+ 0.54130	− 0.00444	+ 0.54147
	L	+ 0.53905	− 0.006445	+ 0.54012
	$M-N$	177° 46′ 53″	177° 44′ 57″	1° 21′ 13″
	$\sin (M-N)$	8.58785	8.59411	8.37333
	$\log m$	9.73249	7.83537	9.75388
		8.32034	6.42948	8.12721
	$\log L$	9.73163	7.80922	9.73249
	$\sin \psi$	8.58871	8.62026	8.39472
	ψ	2° 13′ 23″	2° 23′ 26″	1° 25′ 19″
	$\log \frac{m}{n}$	1.94063	0.02654	1.90011
	$\cos (M-N)$	9.99967 *n*	9.99967 *n*	9.99988
		1.94030 *n*	0.02621 *n*	1.89999
	$-\frac{m}{n} \cos (M-N)$	$+\ 87^m.156$	$+\ 1^m.0622$	$-\ 79^m.432$
	$\log L$	9.73163	7.80922	9.73249
	$\cos \psi$	9.99967	9.99962	9.99986
	$\operatorname{colog} n$	2.20814	2.19117	2.14623
		1.93944	0.00001	1.87858
	$\frac{L \cos \psi}{n}$	$\mp\ 86^m.984$	$\mp\ 1^m.0000$	± 75.610
	τ	$+\ 0^m.172$	$+\ 0^m.0622$ $+\ 2^m.0622$	$-\ 3^m.822$
	T	$8^h\ 20^m$	$9^h\ 45^m$	$11^h\ 10^m$
	t	$8^h\ 20^m\ 10^s.3$	$9^h\ 45^m\ 3^s.7$ $9^h\ 47^m\ 3^s.7$	$11^h\ 6^m\ 10^s.7$
	λ	$8^h\ 14^m\ 58^s.8$	$8^h\ 14^m\ 58^s.8$	$8^h\ 14^m\ 58^s.8$
Local mean time	t	$0^h\ 5^m\ 11^s.5$	$1^h\ 30^m\ 4^s.9$ $1^h\ 32^m\ 4^s.9$	$2^h\ 51^m\ 11^s.9$
Duration of Totality -			$2^m\ 00^s.0$	

No correction is necessary since the computed times agree nearly with the assumed ones. Therefore we have

			h	m	s	
Beginning of the eclipse	Jan.	1	0	5	11.5	Local Mean Time.
Beginning of total eclipse		1	1	30	4.9	
End of total eclipse		1	1	32	4.9	
End of the eclipse		1	2	51	11.9	

Angle of position:

	Beginning.	Ending.
N	90° 48′.9	83° 25′.8
ψ (+ 180)	182 13.4	1 25.3
P	268 35.5	84 51.1

Elements of Occultations.—Pages 420—441 give the elements for the prediction of the times of occultation of stars and planets by the moon. In the columns referring to the star, those headed *Red'ns from* 1889.0 give the quantities necessary to reduce the mean place of the star at the beginning of 1889 to its apparent place at the time of occultation. These reductions are sufficiently accurate to be definitive.

The quantities in the following five columns are all given for the moment of geocentric conjunction of the star and moon in right ascension. Let there be a line passing from the star through the centre of the moon, and let a plane perpendicular to this line pass through the centre of the earth: this plane will be the fundamental plane for the occultation. The system of co-ordinates is similar to that already described for eclipses. The cone circumscribing the moon and star may be regarded as a cylinder having everywhere the same diameter as the moon. This cylinder will intercept the fundamental plane in a circle of which the linear diameter will be the same as that of the moon.

The *Washington Mean Time* is the moment at which the two bodies are in geocentric conjunction in right ascension. At this moment the co-ordinate x of the axis of the cylinder on the fundamental plane has the value zero. The column *Hour-Angle H* gives the common geocentric hour-angle of the moon and star at the same moment, counted from the meridian of Washington—positive toward the west and negative toward the east. Column Y gives the co-ordinate y of the axis of the cylinder upon the fundamental plane at the same moment. Columns x' and y' give the hourly variation of x and y. The linear unit in these columns is the earth's equatorial radius. The limiting parallels, north and south, show the extreme limits of latitude within which the occultation will be visible.

By the aid of these elements, the Washington mean time of immersion and emersion of a star behind the limb of the moon may be computed for any part of the earth by a method nearly the same as that already explained for computing eclipses, only more simple.

We shall first show how to compute an isolated occultation for a particular place, assuming it to be visible at that place, and then show how all the occultations which will be visible at a place may be selected and computed by a more rapid process.

(1) The geocentric co-ordinates of the place, $\rho \sin \varphi'$ and $\rho \cos \varphi'$, are to be computed with three or four places of decimals by the formulæ,

$$\rho \sin \varphi' = \frac{\sin \varphi}{G}$$

$$\rho \cos \varphi' = F \cos \varphi$$

already given in connection with the eclipses.

As in the case of eclipses, it is necessary to have an approximate time of the phenomenon, corresponding to that obtained from the charts of the eclipses. The quantity H being the Washington west hour-angle of the two bodies at the moment of geocentric conjunction, $H - \lambda$ will be the local hour-angle of the star at this same moment. Let us call this angle h_0, putting

$$h_0 = H - \lambda$$

where λ is the longitude west of *Washington.*

The next step will then be to find the approximate moment of apparent conjunction in right ascension as seen from the place. An approximate correction to reduce the time and hour-angle for geocentric conjunction to those for apparent conjunction may be taken from Mr. DOWNES's table, on pages 444—445. This correction will have the same sign as h_0.

When this table is not available, the correction may be computed thus: Compute the quantities ξ_0, ξ' and τ from the formulæ,

$$\xi_0 = \rho \cos \varphi' \sin h_0$$
$$\xi' = [9.4192] \cos (h_0 + \tfrac{1}{6} h_0)$$
$$\tau = \frac{\xi_0}{x' - \xi'}$$

τ will then be the approximate interval between the times of geocentric and local conjunction. By applying it to the Washington mean time of the former, as given with the elements, we shall have the Washington mean time of the latter within a few minutes.

The average duration of an occultation is about an hour. Thence, by adding $0^h.5$ to and subtracting it from the mean time of apparent conjunction, we shall have approximate times of the phases of immersion and emersion for farther computation. Let us then put,

$\tau_1 = \tau - 0^h.5$

$\tau_2 = \tau + 0^h.5$

T, the Washington mean time of geocentric conjunction in R. A.

d, the declination of the star.

(2) Compute for the moments $T + \tau_1$ and $T + \tau_2$ the following quantities, in which we write τ for each of the quantities τ_1 and τ_2. The latter, when used as angles, are to be changed to arc by multiplying by 15, and the minutes are to be further increased by one-sixth the number of degrees in order to reduce to the sidereal hour-angle.

$$\xi = \rho \cos \varphi' \sin (h_0 + \tau)$$
$$\eta = \rho \sin \varphi' \cos d - \rho \cos \varphi' \sin d \cos (h_0 + \tau)$$
$$\xi' = [9.4192] \rho \cos \varphi' \cos (h_0 + \tau)$$
$$\eta' = [9.4192] \rho \cos \varphi' \sin d \sin (h_0 + \tau) = [9.4192] \xi \sin d$$
$$x = x' \tau$$
$$y = Y + y' \tau$$

Compute m, M, n and N from the equations

$$m \sin M = x - \xi$$
$$m \cos M = y - \eta$$
$$n \sin N = x' - \xi'$$
$$n \cos N = y' - \eta'$$
$$n' = \frac{n}{60} = [8.2218]\, n$$
$$\sin \psi = [0.5650]\, m \sin (M - N)$$

Then, t_1 and t_2 from the equations

$$t_1 = -\frac{m}{n'} \cos (M - N) - \frac{[9.4350]}{n'} \cos \psi \quad \text{(Beginning.)}$$
$$t_2 = -\frac{m}{n'} \cos (M - N) + \frac{[9.4350]}{n'} \cos \psi \quad \text{(End.)}$$

The quantities t_1 and t_2 will then be the corrections in minutes to be applied to the respective times $T + \tau_1$ and $T + \tau_2$ to obtain the Washington mean times of the phases.

As in the case of eclipses, the small value of t_1 will give an accurate result for one phase, and the large value an inaccurate result for the other. Both accurate results may then be corrected by comparison with the inaccurate one, in the way described for eclipses, and a result obtained which will probably be correct within a fraction of a minute of time.

As a check upon the result, it will be advisable to compute ξ, η, x and y for the moments finally obtained. If the times are correct these quantities will fulfil the condition,

$$\sqrt{(x - \xi)^2 + (y - \eta)^2} = 0.2723$$

If $\log m \sin (M - N) = 9.4350$ nearly, a recalculation will generally be necessary to determine whether, numerically, $\sin \psi < 1$, or $\sin \psi > 1$. In the latter case, the impossible value of $\sin \psi$ indicates that an occultation at the given place is impossible, unless the computed distance from the moon's limb is within the errors of the ephemerides of the moon and star.

In such cases of near approach to the moon's limb, we may take $\psi = 90°$, or $270°$, according as $\sin (M - N)$ is positive or negative; and for finding the time of nearest approach,

$$t = -\frac{m \cos (M - N)}{n'}$$

Putting π for the moon's horizontal parallax, the distance from the moon's limb will be,

$$\pi \, [m \sin (M - N) - 0.2723]$$

disregarding the sign of $\sin (M - N)$; or, allowing for the augmentation of the semidiameter,

$$\pi \, [m \sin (M - N) - 0.2723] \, [1 + z \sin \pi]$$

where

$$z = \rho \cos \varphi' \cos d \cos (h_0 + \tau) + \rho \sin \varphi' \sin d$$

The position-angle P, of the line from the moon's centre to the star at the times of contact, reckoned from the north point toward the east, is given by the formulæ: —

$$P = N - \psi \qquad \text{for immersion,}$$
$$P = N + \psi \pm 180° \qquad \text{for emersion,}$$

it being supposed that the value of ψ, in each case, is taken between the limits $\pm 90°$.

To find the angle from the vertex, we compute the angle C from the formula,

$$\tan C = \frac{\xi + t\,\xi'}{\eta + t\,\eta'}$$

in which the value of t corresponding to the phase is to be used. Then

$$V = P - C$$

is the angle from the vertex, also reckoned from the north toward the east.

As an example of an isolated occultation, we shall compute that of 83 Cancri, 1889, May 7, for Williamstown, Mass., whose position is

$$\varphi = +\ 42°\ 42'\ 49''$$
$$\lambda = -\ 0^h\ 15^m\ 18^s.6$$

Constants for the given place,

$$\log \rho \sin \varphi' = 9.82920$$
$$\log \rho \cos \varphi' = 9.86681$$

From the table of elements, page 427, we have

$$H = +\ 1^h\ 43^m.3$$

Hence $\qquad h_0 = H - \lambda = +\ 1^h\ 58^m.6$

From Downes's Table, pages 444—45, or from the formulæ on page 507, we find the correction to the Washington mean time of geocentric conjunction as given on page 427, to be $+\ 66^m.2$; therefore the Washington mean time of apparent conjunction at the given place is $8^h\ 58^m$.

We shall assume the duration of the occultation to be 50^m, therefore by subtracting and adding 25^m, we shall have the approximate Washington mean times of immersion and emersion to be used in the computation, thus:

For Immersion, $\quad \tau_1 = +\ \overset{h}{0}.687; \qquad T_1 = \text{May } \overset{d}{7},\ \overset{h}{8}\ \overset{m}{33}$

For Emersion, $\quad \tau_2 = +\ 1.520; \qquad T_2 = \text{May } 7,\ 9\ 23$

	Immersion.	Emersion.
	h m	h m
h_0	+ 1 58.60	+ 1 58.60
τ (in sidereal time)	+ 41.31	+ 1 31.45
$h_0 + \tau$	+ 2 39.91	+ 3 30.05
$h_0 + \tau$ (in arc)	39° 58′ 41″	52° 30′ 45″

	Immersion.	Emersion.
$\rho \cos \varphi'$	9.86681	9.86681
$\sin (h_0 + \tau)$	9.80787	9.89954
$\log \xi$	9.67468	9.76635
ξ	+ 0.47280	+ 0.58391
$\rho \sin \varphi'$	9.82920	9.82920
$\cos d$	9.97777	9.97777
$\log \rho \sin \varphi' \cos d$	9.80697	9.80697
(1)	+ 0.64116	+ 0.64116
$\rho \cos \varphi'$	9.86681	9.86681
$\sin d$	9.49408	9.49408
$\cos (h_0 + \tau)$	9.88440	9.78433
$\log \rho \cos \varphi' \sin d \cos (h_0 + \tau)$	9.24529	9.14522
(2)	+ 0.17591	+ 0.13971
(1)−(2) η	+ 0.46525	+ 0.50145
const. log	9.41920	9.41920
$\log \rho \cos \varphi' \cos (h_0 + \tau)$	9.75121	9.65114
$\log \xi'$	9.17041	9.07034
ξ'	+ 0.14805	+ 0.11758
const. log	9.41920	9.41920
$\log \xi$	9.67468	9.76635
$\sin d$	9.49408	9.49408
$\log \eta'$	8.58796	8.67963
η'	+ 0.03872	+ 0.04782
$\log x'$	9.73432	9.73432
$\log \tau$	9.83674	0.18184
$\log x$	9.57106	9.91616
x	+ 0.37244	+ 0.82444
ξ	+ 0.47280	+ 0.58391
$x - \xi$	− 0.10036	+ 0.24053
$\log y'$	9.09447 *n*	9.09447 *n*
$\log \tau$	9.83674	0.18184
$\log y' \tau$	8.93121 *n*	9.27631 *n*
$y' \tau$	− 0.08535	− 0.18893
Y	+ 0.80280	+ 0.80280
$Y + y' \tau = y$	+ 0.71745	+ 0.61387
η	+ 0.46525	+ 0.50145
$y - \eta$	+ 0.25220	+ 0.11242
$x' - \xi'$	+ 0.39435	+ 0.42482
$y' - \eta'$	− 0.16302	− 0.17212
$\log m \sin M$	9.00156 *n*	9.38117
$\log m \cos M$	9.40175	9.05084
$\tan M$	9.59981 *n*	0.33033
M	338° 18′ 3″	64° 57′ 0″
$\sin M$	9.56789 *n*	9.95710
$\log m$	9.43367	9.42407

	Immersion.	Emersion.
$\log n \sin N$	9.59588	9.62820
$\log n \cos N$	9.21224 n	9.23583 n
$\tan N$	0.38364 n	0.39237 n
N	112° 27′ 35″	112° 3′ 20″
$\sin N$	9.96574	9.96699
$\log n$	9.63014	9.66121
colog 60	8.22185	8.22185
$\log n'$	7.85199	7.88306
const. log	0.56500	0.56500
$\log m$	9.43367	9.42407
$\sin (M - N)$	9.85596 n	9.86487 n
$\sin \psi$	9.85463 n	9.85394 n
ψ	−45° 41′ 15″	−45° 35′ 40″
$\log \frac{m}{n'}$	1.58168	1.54101
$\cos (M - N)$	9.84302 n	9.83292
$\log \frac{m}{n'} \cos (M - N)$	1.42470 n	1.37393
const. log	9.43500	9.43500
colog n'	2.14801	2.11694
$\cos \psi$	9.84421	9.84493
	1.42722	1.39687
	m	m
$- \frac{m}{n'} \cos (M - N)$	+ 26.589	− 23.656
$\frac{[9.43500]}{n'} \cos \psi$	∓ 26.744	± 24.939
t_1	− 0.155	+ 1.283
t_2 (inaccurate)	+ 53.333	− 48.595
	d h m	h m
Washington conjunction + τ	8 33	9 23
Washington mean time of phase, May	7 8 32.845	9 24.283
λ	0 15.310	0 15.310
Williamstown mean time of phase, May	7 8 48.155	9 39.593

The position angles are

	At Immersion.	At Emersion.
	° ′	° ′
N	112 27.6	112 3.3
ψ	− 45 41.2	− 45 35.7
		+ 180
P	158 8.8	246 27.6

Prediction of Many Occultations for a Given Place.—When it is desired to predict all the occultations which will be visible at some one place, tables may be constructed and applied in such a way as to greatly diminish the labor of computation. In using such tables, the most convenient course will be to find for each occultation the hour-angle of the star at the moment of apparent conjunction in right ascension, as seen from the place of observation. The table of elements, pages 420—441, gives H, the Washington hour-angle at the moment of geocentric conjunction. The corresponding geocentric hour-angle at the place will be

$$h_0 = H - \lambda \qquad (\lambda = \text{west longitude from Washington}).$$

The moment of apparent conjunction, as seen from the station, will be given by the condition $\xi = x$; or, using the values of ξ and x,

$$\rho \cos \varphi' \sin h = x' \tau$$

h being the west hour-angle of the star at the moment in question, and τ the interval, in hours of mean time, which has elapsed since geocentric conjunction. We shall therefore have,

$$h = h_0 + \tau$$

for the hour-angle at the end of the interval τ after geocentric conjunction. In strictness, τ should here be multiplied by the factor $1 + \frac{1}{365.25}$, because the star moves a little more than 15° in an hour of mean time; but the error arising from the neglect of the factor is too small to be important, as it will affect the predicted time of conjunction by less than 10 seconds. The equation for finding τ is therefore,

$$\rho \cos \varphi' \sin (h_0 + \tau) = x' \tau$$

The quantities h_0 and x' being derived immediately from the data of the Ephemeris, the quantity τ is readily obtained by successive approximation, and may be tabulated as a function of h_0 and x'. The computation of τ is effected as follows: We have

$$\sin (h_0 + \tau) = \sin h_0 + 2 \sin \tfrac{1}{2} \tau \cos (h_0 + \tfrac{1}{2} \tau) \tag{1}$$

The value of τ in arc being seldom more than 24° we may put τ itself for $2 \sin \frac{1}{2} \tau$. The equation will then become

$$\rho \cos \varphi' \sin h_0 + \tau \rho \cos \varphi' \cos (h_0 + \tfrac{1}{2} \tau) = x' \tau$$

from which we find

$$\tau = \frac{\rho \cos \varphi' \sin h_0}{x' - k \rho \cos \varphi' \cos (h_0 + \frac{1}{2} \tau)} \tag{2}$$

To tabulate τ, we must first have a table of the quantities

$$\begin{aligned} \xi &= \rho \cos \varphi' \sin h \\ \xi' &= [9.41916] \rho \cos \varphi' \cos h \end{aligned} \tag{3}$$

which table may be formed for every 10 minutes (in time) of h. If we then put ξ_0 for the value of ξ corresponding to $h = h_0$ and ξ'_1 for the value of ξ' corresponding to $h = h_0 + \frac{1}{2} \tau$, we shall have

$$\tau = \frac{\xi_0}{x' - \xi'_1} \tag{4}$$

Since we must know the value of τ, approximately, before we can take ξ'_1 from the table, this equation can be solved only by successive approximations. The approximations converge so rapidly as to offer no difficulty. It will be best to begin by computing values of τ for the two extremes of x', namely, $x'=0.48$ and $x'=0.60$, because the approximate values of τ can then be interpolated for all intermediate values of x'. For the first approximation may be taken—

$$\begin{aligned} \tfrac{1}{2} \tau &= 50^m \sin \tfrac{4}{3} h_0 \quad (\text{for } x' = 0.48) \\ \tfrac{1}{2} \tau &= 40^m \sin \tfrac{4}{3} h_0 \quad (\text{for } x' = 0.60) \end{aligned} \tag{5}$$

or, the approximate values of τ may be taken from Mr. DOWNES's table, pages 444—445. It will be best to make the computation for every 30^m of h_0, and to find the intermediate values of τ for every 10^m by interpolation. Then for each 30^m of h_0 we take ξ' from a table with the argument $h_0 + \frac{1}{2} \tau$, and $\log \xi$ with the argument h_0, and thence compute τ by (4). If the value of τ thus arrived at differs more than 3^m from that employed in taking out ξ', a new value may be used to correct ξ', and the computation may be repeated. The values corresponding to $x'=0.51$, $x'=0.54$, and $x'=0.57$, can then be computed with the single interpolation of approximate values of τ, and afterward the table can be extended by interpolation to every 0.01 of x' between $x'=0.48$ and $x'=0.62$. It will be best to compute τ in the first place to every 0.001 of an hour, and to drop the last figure in forming the definitive table. The table thus formed will be called *Table I.*

The values of η and η' may then be tabulated for every degree of the star's declination, and every 10^{m} of h. It will not be really necessary to compute the table for negative values of d, since by putting

$$\begin{aligned}\eta_1 &= \rho \sin \varphi' \cos d\\ \eta_2 &= -\rho \cos \varphi' \sin d \cos h\end{aligned}$$

η_1 may be given in a table of single-entry; and taking η_2 from the table of double-entry for a positive d, we shall have

$$\eta = \eta_1 \pm \eta_2$$

the lower sign being used for a negative d. But the extension of the table for η to negative values of d is so readily made that it will probably be found better to do it, so as to save taking out η_1 and η_2 separately.

This table for η will be called *Table II*, and the corresponding one for η' with the same arguments *Table III.* The precepts for using the tables will then be as follow:—

From Table I with the arguments x' and $H-\lambda=h_0$ take out the value of τ. It will be sufficient to use the nearest 0.01 of x'. τ will be of the same sign as h_0. Then, enter Table II with the arguments d (the star's declination) and $h=h_0+\tau$, and take out the value of η Form the quantities $y=Y+y'\tau$, and $y-\eta$. If the latter quantity lies between the limits ± 0.28, it is almost certain that there will be an occultation. If it falls without the limits ± 0.33, it is almost certain that there will not be an occultation. Between the years 1881 and 1890 these last limits may be reduced to ± 0.32, and cases near this limit may be rejected if y' is small. A convenient rule to adopt will be—

$$\begin{array}{rl} y' < 0.10, & \text{limits} = \pm\ 0.29\\ 0.10 < y' < 0.15, & \text{limits} = \pm\ 0.30\\ 0.15 < y' < 0.20, & \text{limits} = \pm\ 0.31\\ 0.20 < y' \phantom{< 0.20,} & \text{limits} = \pm\ 0.33 \text{ or } \pm\ 0.32\end{array}$$

Here, only the absolute value of y' is to be considered, without respect to its algebraic sign.

If $y-\eta$ falls between the limits thus indicated, take the values of ξ' and η' from the appropriate tables and compute v, Q and Δ from the equations

$$\begin{aligned}v \sin Q &= y' - \eta'\\ v \cos Q &= x' - \xi'\\ \Delta &= (y-\eta) \cos Q\end{aligned}$$

If $\Delta > 0.2723$ or $\log \Delta > 9.4350$ there will be no occultation, though the moon may graze the star when $\Delta - 0.2723$ is very small. If $\Delta < 0.2723$, compute

$$\tau_1 = -\frac{y-\eta}{v} \sin Q \qquad \cos P = \frac{\Delta}{0.2723} \qquad (P < 180^\circ)$$

$$\tau_2 = \frac{0.2723 \sin P}{v}$$

We shall then have—

Local mean time of immersion, $T-\lambda+\tau+\tau_1-\tau_2$

Local mean time of emersion, $T-\lambda+\tau+\tau_1+\tau_2$

Position-angle from north toward east at immersion, $180^\circ - Q - P$

Position-angle from north toward east at emersion, $180^\circ - Q + P$

In predicting the occultations for a given place, the first operation will be to go over the list of occultations in the Ephemeris, and select those which may be visible. The conditions of possible visibility are:—

1. The limiting parallels in the last columns must include the latitude of the place.

2. The quantity $H - \lambda$, taken without regard to sign, must be less than the semi-diurnal arc of the star by at least one hour. On very rare occasions an emersion might be seen in the east horizon, or an immersion in the west, when this difference is a few minutes less than an hour.

3. The sun must not be much more than an hour above the horizon at the local mean time $T - \lambda$, unless the star is bright enough to be seen in the day time.

The most convenient course will be to write the value of $-\lambda$ on the bottom of a sheet of paper, and, passing through the list of occultations, pause over each one for which condition (1) is fulfilled, and examine whether conditions (2) and (3) are fulfilled. If either fails, the computer passes on. Very often it will require some examination to find whether $H - \lambda$ or $T - \lambda$ falls within the limits; in these cases, the computer may mark the occultation for trial and leave the decision for the subsequent operations. The whole list can be gone over in less than a day, and it will probably be found that about one-tenth of the occultations are marked for trial.

Phenomena of Planets and Satellites, pages 446—483.—These are, for the most part, sufficiently explained in the body of the work. The following additional explanations are added for completeness.

Disks of Mercury and Venus, pages 446—447.—The angle θ, needed in reducing meridian observations, is the angle which the arc of the great circle from the planet to the sun, makes with the arc from the planet toward the west, reckoned in the direction west, north, east, south. This position-angle is reckoned from 0° to 360°, as in the measurement of double stars, the planet taking the place of the central star. But its measure is 90° greater than that of a double star.

We may also regard θ as expressing the angle which the line of cusps makes with the meridian, the positive direction of the meridian being toward the north, and the positive direction of the line of cusps that in which a person following this line would have the illuminated portion of the disk on his right.

Satellites of Jupiter, pages 449—475.—The times of phenomena are explained at the foot of each page; the diagram is on page 449.

Phenomena, pages 482—483.—The conjunctions, quadratures, and oppositions of the planets with respect to the sun, give the hours when the longitude of each planet differs from that of the sun by 0°, 90° or 180°.

The conjunctions of the moon and planets with each other are given in right ascension. The degrees and minutes to the right show the difference of declination at the moment of conjunction.

Latitude by Observed Altitude of Polaris.—Table IV replaces the Tables A, B, C, D, given as a *Supplement* to the volumes of the Ephemeris for 1874—1881, and is intended for use at sea and reconnaissance on land. It will furnish an approximate value of the latitude, the probable error of which, in so far as the table is concerned, will be a few tenths of a minute of arc.

The directions for using the table are adapted to a right ascension of Polaris equal to $1^h\ 18^m$. Somewhat greater accuracy may be insured by substituting the right ascension of Polaris at the date of observation, from pages 302—313 of this volume.

APPENDIX.

ON THE CONSTRUCTION OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC FOR 1889.

The adopted constants of precession, nutation, and aberration are those of **Struve** and **Peters**, namely:—

$$\begin{aligned}\text{Precession} &= 50''.2411 + 0''.0002268\ t\\ \text{Nutation} &= 9''.2231 + 0''.000009\ t\\ \text{Aberration} &= 20''.4451\end{aligned}$$

in which t is the number of years after 1800.0.

The obliquity of the ecliptic is that of **Hansen**'s *Tables du Soleil*, which is 0″.31 greater than that of **Peters**, given in the issues of this Ephemeris preceding that for 1882. A comparison of **Hansen**'s mean obliquity with that of **Peters** and of **Le Verrier** at different epochs is given in the following table:—

Epoch.	Hansen.			Peters.	Le Verrier.	H.—P.	H.—L.
	°	′	″	″	″	″	″
1750	23	28	18.19	17.44	19.42	+0.75	−1.23
1800	23	27	54.80	54.22	55.63	+0.58	−0.83
1850	23	27	31.42	30.99	31.83	+0.43	−0.41
1900	23	27	8.02	7.76	8.03	+0.26	−0.01

The formulæ for reducing the places of the fixed stars, page 280, correspond to the *Star Tables of the American Ephemeris*, Washington, 1869.

The mean right ascensions of stars have been reduced to **Newcomb**'s fundamental standard in the catalogue attached to the *Washington Observations for* 1870, Appendix II, with the following exceptions: The right ascensions of the 48 circumpolar stars north of 60° north declination are from Dr. **Gould**'s *Standard Places of Fundamental Stars*, second edition, United States Coast Survey Office, 1866. Of the twelve stars south of 50° south declination, the positions of β Hydri, α Trianguli Australis, and σ Octantis, have been corrected from data furnished by Dr. **Gould**; while the remaining nine are, as before, from the *British Nautical Almanac* for 1848.

The right ascensions of additional stars in the general list, for which no apparent places are given in the subsequent section, have been taken partly from the *Catalogue of* 1098 *Standard Clock and Zodiacal Stars*, forming Part IV of Vol. I of *Astronomical Papers Prepared for the Use of the American Ephemeris and Nautical Almanac*, Washington, 1881; and partly from the catalogue of the Astronomische Gesellschaft of 1878. A few have been derived from recent catalogues without a rigorous reduction for equinox.

The mean declinations of stars are taken from Boss's paper in the *Report of the Northern Boundary Commission*, Washington, 1879, for all stars found therein. The declinations of all the other stars have been reduced to the same standard, except those of the additional ones above, which have been taken partly from the Astronomische Gesellschaft list, and partly from places in recent catalogues. To the apparent places of Sirius and Procyon have been applied the periodic corrections resulting from **Auwers**'s investigations.

The values of these corrections are:—

Year.	Sirius.		Procyon.	
1889.0	$\Delta\alpha = +0^{s}.086$	$\Delta\delta = -0''.89$	$\Delta\alpha = +0^{s}.036$	$\Delta\delta = +0''.90$
1890.0	$\Delta\alpha = +0.110$	$\Delta\delta = -0.50$	$\Delta\alpha = +0.045$	$\Delta\delta = +0.80$

The ephemeris of the sun is constructed from **Hansen** *and* **Olufsen**'s *Tables du Soleil*, Copenhagen, 1853, except that **Struve**'s aberration has been used. This is equivalent to adding 0″.19 to the true longitudes, but it does not affect the right ascensions and declinations. The sun's rectangular equatorial co-ordinates have been computed from the longitudes and latitudes by the following formulæ:—

$$\begin{aligned} X &= R \cos \lambda \\ Y &= R \sin \lambda \cos \omega - 19.3\, R\, \beta \\ Z &= R \sin \lambda \sin \omega + 44.5\, R\, \beta \end{aligned}$$

The reductions to mean equinox, 1889.0, are computed by the formulæ,

$$\begin{aligned} \Delta X' &= + Y \sec \omega\, \Delta \lambda \sin 1'' \\ \Delta Y' &= - X \cos \omega\, \Delta \lambda \sin 1'' + Z\, \Delta \omega \sin 1'' - 9.4\, \tau\, R \sin (\lambda + 187^\circ) \\ \Delta Z' &= - X \sin \omega\, \Delta \lambda \sin 1'' - Y\, \Delta \omega \sin 1'' + 21.7\, \tau\, R \sin (\lambda + 187^\circ) \end{aligned}$$

Wherein—

λ and β	are the longitude and latitude of the sun referred to the equinox and ecliptic of the date;
ω,	the obliquity of the ecliptic;
$\Delta \lambda$,	the reduction of longitude for precession and nutation from January 0;
$\Delta \omega$,	the reduction of the mean to the apparent obliquity;
τ,	the fraction of the year since January 0.

The numerical coefficients are in units of the seventh place of decimals. The correction for latitude has been taken from **Goetze**'s paper in the *Astronomical Journal*, Vol. II, page 71.

The mean equatorial horizontal parallax of the sun, adopted from Professor **Newcomb**'s *Investigation of the Distance of the Sun and the Elements which depend on it*,* is 8″.848. The adopted semidiameter of the sun at the earth's mean distance is 16′ 2″. In the computations pertaining to eclipses, **Bessel**'s semidiameter, 15′ 59″.788 has been used.

The right ascension, declination and parallax of the moon are derived from **Hansen**'s *Tables de la Lune*, London, 1857, the mean longitude being corrected in accordance with **Newcomb**'s *Researches on the Motion of the Moon*, Part I, page 268,† and a corrected table being substituted for Table XXXIV.

The semidiameter of the moon is computed from the moon's horizontal parallax by the formula,

$$S = 0.272274\, \pi + 2''.5$$

The constant 2″.5 is omitted in the computation of eclipses and occultations, as due entirely to telescopic and ocular irradiation.

The ephemeris of Mercury is derived from Professor **Winlock**'s *Tables of Mercury*, Washington, 1864. They are based on the older theory of **Le Verrier**, published in the Additions to the *Connaissance des Temps* for 1848.

The ephemeris of Venus is derived from Mr. G. W. **Hill**'s *Tables of Venus*, Washington, 1872.

The ephemeris of Mars is derived from manuscript tables constructed from **Lindenau**'s Tables. Mr. **Hugh Breen**'s results, contained in his paper *On the Corrections of* **Lindenau**'s *Elements of Mars*, published in the *Memoirs of the Royal Astronomical Society*, Vol. XX, have also been discussed and applied; and **Le Verrier**'s secular variations of the elements are likewise adopted. The perturbations produced by Jupiter have been increased by $\frac{1}{50}$ of their value. The following are the corresponding corrected elements and annual variations for Washington, 1855.0:—

$$\begin{array}{llrrrcrl} L & = & 320^\circ & 13' & 33''.87 & + & 689101''.1527 & t \\ \pi & = & 333 & 23 & 17.84 & + & 65.9990 & t \\ \Omega & = & 48 & 25 & 55.29 & + & 27.6997 & t \\ i & = & 1 & 51 & 2.20 & - & 0.02141 & t \\ e & = & & & 19238''.75 & + & 0.18549 & t \\ n & = & \multicolumn{4}{l}{689050''.8927} & & \\ a & = & \multicolumn{4}{l}{1.5236915} & & \end{array}$$

The ephemeris of Jupiter is derived from manuscript tables constructed from **Bouvard**'s Tables, with such changes as were required to make them correspond more nearly to the formulæ.

The ephemeris of Saturn is derived from a provisional theory constructed by Mr. **George W. Hill**, and still unpublished.

The ephemerides of Uranus and Neptune are derived from Professor **Newcomb**'s Tables, published by the *Smithsonian Institution*.

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* *Astronomical Observations made at the U. S. Naval Observatory, Washington*, 1865, Appendix II.

† *Astronomical Observations made at the U. S. Naval Observatory, Washington*, 1875, Appendix II.

The semidiameters of the planets are computed from the following values:—

	Semidiameter.	Log Dist.	Authority.
Mercury	3″.34	0.00	Le Verrier, *Theory of Mercury.*
Venus	8.546 ± 0.086″	0.00	Peirce, from the Washington Observations of 1845 and 1846, made with the Mural Circle.
Mars	2.842 ± 0.057	0.25	
Jupiter (polar)	18.78 ± 0.067	0.70	
Saturn (polar)	8.77 ± 0.039	0.95	
Uranus	1.68 ± 0.3	1.30	
Neptune	1.28	1.48	
Jupiter (equatorial)	20.00	0.70	
Saturn (equatorial)	9.38	0.95	

The elements of eclipses of the sun and occultations of stars by the moon are adapted to Bessel's method, using the special forms in Chauvenet's *Spherical and Practical Astronomy.* The adopted semidiameters are:—

Semidiameter of the sun at distance unity. . . .	959″.788
Ratio of radius of moon to radius of earth . . .	0.27227

The eclipses of Jupiter's satellites are computed from Todd's *Continuation of* Damoiseau's *Tables,* Washington, 1876. The occultations, transits, etc., are computed from Woolhouse's Tables, *British Nautical Almanac* for 1835, Table II of each satellite having been adapted to Damoiseau's Tables.

The elongations and conjunctions of the satellites of Saturn are computed from manuscript tables prepared by Professor Newcomb.

The apparent elements of the rings of Saturn are computed from Bessel's data, except those for the dusky ring.

The elongations of the satellites of Uranus, and of the satellite of Neptune are computed from the data of Professor Newcomb's *Uranian and Neptunian Systems,* Washington, 1875.

In compiling the positions of observatories, the latest available data have been used. The positions have been furnished, in many instances, through the courtesy of the directors of the Observatories, in response to a circular issued by the Superintendent of the American Ephemeris.

The reduction to geocentric latitude, and the logarithm of the radius of the earth, are derived from Bessel's elements of the terrestrial spheroid, as adopted in Table III of Chauvenet's *Spherical and Practical Astronomy,* Vol. II:—

$$\log e = 8.9122052$$

$$\varphi' - \varphi = -11' 30''.65 \sin 2\varphi + 1''.16 \sin 4\varphi$$

$$\log \rho = 9.9992747 + 0.0007271 \cos 2\varphi - 0.0000018 \cos 4\varphi$$

Table IV, for finding the latitude from an observed altitude of Polaris, is constructed for—

(1) An altitude of Polaris equal to 45°.

(2) A declination of Polaris equal to + 88° 43′.

The principal computations of the Ephemeris have been distributed in the following manner:—

The sun has been computed by Mr. Eastwood; the moon's longitude, latitude, semidiameter and horizontal parallax, by Professor Keith; right ascension and declination, by Professor Van Vleck; culminations, by Professor Runkle; lunar distances, by Mr. W. B. Oliver; Mercury and Venus, by Mr. E. P. Austin; Mars, Jupiter, Saturn, Uranus, and Neptune, by Mr. Roberdeau Buchanan; Jupiter's satellites, by Mr. W. F. McK. Ritter. The fixed stars have been prepared by Mr. Wiessner and Mr. H. Meier; the general constants for their reduction, by Mr. Wiessner; the occultations, by Mr. J. O. Wiessner; and the eclipses have been computed and the charts projected by Mr. Buchanan.

TABLE I.

CORRECTION REQUIRED, ON ACCOUNT OF SECOND DIFFERENCES OF THE MOON'S MOTION, IN FINDING THE GREENWICH TIME CORRESPONDING TO A CORRECTED LUNAR DISTANCE.

DIFFERENCE OF THE PROPORTIONAL LOGARITHMS IN THE EPHEMERIS.

Approximate Interval.		2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52
h m	h m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s
0 0	3 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0 10	2 50	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3
0 20	2 40	0	1	1	1	1	2	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	5	6	6	6	6
0 30	2 30	0	1	1	2	2	2	2	3	3	3	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9
0 40	2 20	0	1	1	2	2	3	3	3	4	4	5	5	6	6	6	7	7	8	8	9	9	10	10	10	11	11
0 50	2 10	1	1	2	2	3	3	4	4	5	5	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	13
1 0	2 0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	13	14	14
1 10	1 50	1	1	2	2	3	4	4	5	5	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	15
1 20	1 40	1	1	2	3	3	4	4	5	6	6	7	7	8	9	9	10	10	11	12	12	13	14	14	15	15	16
1 30	1 30	1	1	2	3	3	4	4	5	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16

DIFFERENCE OF THE PROPORTIONAL LOGARITHMS IN THE EPHEMERIS.

		54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100
h m	h m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s
0 0	3 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0 10	2 50	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	7
0 20	2 40	7	7	7	7	8	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12
0 30	2 30	9	10	10	10	11	11	12	12	12	13	13	13	14	14	14	14	15	15	16	16	16	17	17	17
0 40	2 20	12	12	13	13	13	14	14	15	15	16	16	16	17	17	18	18	19	19	19	20	20	21	21	22
0 50	2 10	14	14	15	15	16	16	16	17	17	18	19	19	20	20	21	21	22	22	22	23	23	24	24	25
1 0	2 0	15	16	16	17	17	18	18	19	19	20	21	21	22	22	23	23	24	24	25	25	26	27	27	28
1 10	1 50	16	17	17	18	18	19	19	20	21	21	22	22	23	24	24	25	25	26	27	27	28	28	29	30
1 20	1 40	17	17	18	19	19	20	20	21	21	22	23	23	24	25	25	26	26	27	28	28	29	29	30	31
1 30	1 30	17	18	18	19	19	20	21	21	22	23	23	24	24	25	25	26	27	27	28	29	29	30	31	31

DIFFERENCE OF THE PROPORTIONAL LOGARITHMS IN THE EPHEMERIS.

		102	104	106	108	110	112	114	116	118	120	122	124	126	128	130	132	134	136	138
h m	h m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s
0 0	3 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0 10	2 50	7	7	7	7	7	7	7	8	8	8	8	8	8	8	8	9	9	9	9
0 20	2 40	13	13	13	13	14	14	14	14	15	15	15	15	15	16	16	16	16	17	17
0 30	2 30	18	18	18	19	19	19	20	20	20	21	21	21	22	22	22	23	23	24	24
0 40	2 20	22	22	23	23	24	24	25	25	25	26	26	27	27	28	28	28	29	29	30
0 50	2 10	26	26	26	27	27	28	29	29	29	30	30	31	31	32	32	33	33	34	34
1 0	2 0	28	29	29	30	30	31	31	32	33	33	34	34	35	35	36	37	37	38	38
1 10	1 50	30	31	31	32	32	33	34	34	35	35	36	37	37	38	38	39	40	40	41
1 20	1 40	31	32	33	33	34	34	35	35	36	37	38	38	39	39	40	41	41	42	42
1 30	1 30	32	32	33	34	34	35	35	36	36	37	38	39	39	40	40	41	42	42	43

The correction is to be added to the approximate Greenwich time when the proportional logarithms in the Ephemeris are decreasing, and subtracted when they are increasing.

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TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Side-real.	$0^{\text{h.}}$	$1^{\text{h.}}$	$2^{\text{h.}}$	$3^{\text{h.}}$	$4^{\text{h.}}$	$5^{\text{h.}}$	$6^{\text{h.}}$	$7^{\text{h.}}$	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	0 0.000	0 9.830	0 19.659	0 29.489	0 39.318	0 49.148	0 58.977	1 8.807	0	0.000
1	0 0.164	0 9.993	0 19.823	0 29.653	0 39.482	0 49.312	0 59.141	1 8.971	1	0.003
2	0 0.328	0 10.157	0 19.987	0 29.816	0 39.646	0 49.475	0 59.305	1 9.135	2	0.005
3	0 0.491	0 10.321	0 20.151	0 29.980	0 39.810	0 49.639	0 59.469	1 9.298	3	0.008
4	0 0.655	0 10.485	0 20.314	0 30.144	0 39.974	0 49.803	0 59.633	1 9.462	4	0.011
5	0 0.819	0 10.649	0 20.478	0 30.308	0 40.137	0 49.967	0 59.796	1 9.626	5	0.014
6	0 0.983	0 10.813	0 20.642	0 30.472	0 40.301	0 50.131	0 59.960	1 9.790	6	0.016
7	0 1.147	0 10.976	0 20.806	0 30.635	0 40.465	0 50.295	1 0.124	1 9.954	7	0.019
8	0 1.311	0 11.140	0 20.970	0 30.799	0 40.629	0 50.458	1 0.288	1 10.118	8	0.022
9	0 1.474	0 11.304	0 21.134	0 30.963	0 40.793	0 50.622	1 0.452	1 10.281	9	0.025
10	0 1.638	0 11.468	0 21.297	0 31.127	0 40.956	0 50.786	1 0.616	1 10.445	10	0.027
11	0 1.802	0 11.632	0 21.461	0 31.291	0 41.120	0 50.950	1 0.779	1 10.609	11	0.030
12	0 1.966	0 11.795	0 21.625	0 31.455	0 41.284	0 51.114	1 0.943	1 10.773	12	0.033
13	0 2.130	0 11.959	0 21.789	0 31.618	0 41.448	0 51.278	1 1.107	1 10.937	13	0.035
14	0 2.294	0 12.123	0 21.953	0 31.782	0 41.612	0 51.441	1 1.271	1 11.100	14	0.038
15	0 2.457	0 12.287	0 22.117	0 31.946	0 41.776	0 51.605	1 1.435	1 11.264	15	0.041
16	0 2.621	0 12.451	0 22.280	0 32.110	0 41.939	0 51.769	1 1.599	1 11.428	16	0.044
17	0 2.785	0 12.615	0 22.444	0 32.274	0 42.103	0 51.933	1 1.762	1 11.592	17	0.046
18	0 2.949	0 12.778	0 22.608	0 32.438	0 42.267	0 52.097	1 1.926	1 11.756	18	0.049
19	0 3.113	0 12.942	0 22.772	0 32.601	0 42.431	0 52.260	1 2.090	1 11.920	19	0.052
20	0 3.277	0 13.106	0 22.936	0 32.765	0 42.595	0 52.424	1 2.254	1 12.083	20	0.055
21	0 3.440	0 13.270	0 23.099	0 32.929	0 42.759	0 52.588	1 2.418	1 12.247	21	0.057
22	0 3.604	0 13.434	0 23.263	0 33.093	0 42.922	0 52.752	1 2.582	1 12.411	22	0.060
23	0 3.768	0 13.598	0 23.427	0 33.257	0 43.086	0 52.916	1 2.745	1 12.575	23	0.063
24	0 3.932	0 13.761	0 23.591	0 33.420	0 43.250	0 53.080	1 2.909	1 12.739	24	0.066
25	0 4.096	0 13.925	0 23.755	0 33.584	0 43.414	0 53.243	1 3.073	1 12.903	25	0.068
26	0 4.259	0 14.089	0 23.919	0 33.748	0 43.578	0 53.407	1 3.237	1 13.066	26	0.071
27	0 4.423	0 14.253	0 24.082	0 33.912	0 43.742	0 53.571	1 3.401	1 13.230	27	0.074
28	0 4.587	0 14.417	0 24.246	0 34.076	0 43.905	0 53.735	1 3.564	1 13.394	28	0.076
29	0 4.751	0 14.581	0 24.410	0 34.240	0 44.069	0 53.899	1 3.728	1 13.558	29	0.079
30	0 4.915	0 14.744	0 24.574	0 34.403	0 44.233	0 54.063	1 3.892	1 13.722	30	0.082
31	0 5.079	0 14.908	0 24.738	0 34.567	0 44.397	0 54.226	1 4.056	1 13.886	31	0.085
32	0 5.242	0 15.072	0 24.902	0 34.731	0 44.561	0 54.390	1 4.220	1 14.049	32	0.087
33	0 5.406	0 15.236	0 25.065	0 34.895	0 44.724	0 54.554	1 4.384	1 14.213	33	0.090
34	0 5.570	0 15.400	0 25.229	0 35.059	0 44.888	0 54.718	1 4.547	1 14.377	34	0.093
35	0 5.734	0 15.563	0 25.393	0 35.223	0 45.052	0 54.882	1 4.711	1 14.541	35	0.096
36	0 5.898	0 15.727	0 25.557	0 35.386	0 45.216	0 55.046	1 4.875	1 14.705	36	0.098
37	0 6.062	0 15.891	0 25.721	0 35.550	0 45.380	0 55.209	1 5.039	1 14.868	37	0.101
38	0 6.225	0 16.055	0 25.885	0 35.714	0 45.544	0 55.373	1 5.203	1 15.032	38	0.104
39	0 6.389	0 16.219	0 26.048	0 35.878	0 45.707	0 55.537	1 5.367	1 15.196	39	0.106
40	0 6.553	0 16.383	0 26.212	0 36.042	0 45.871	0 55.701	1 5.530	1 15.360	40	0.109
41	0 6.717	0 16.546	0 26.376	0 36.206	0 46.035	0 55.865	1 5.694	1 15.524	41	0.112
42	0 6.881	0 16.710	0 26.540	0 36.369	0 46.199	0 56.028	1 5.858	1 15.688	42	0.115
43	0 7.045	0 16.874	0 26.704	0 36.533	0 46.363	0 56.192	1 6.022	1 15.851	43	0.117
44	0 7.208	0 17.038	0 26.867	0 36.697	0 46.527	0 56.356	1 6.186	1 16.015	44	0.120
45	0 7.372	0 17.202	0 27.031	0 36.861	0 46.690	0 56.520	1 6.350	1 16.179	45	0.123
46	0 7.536	0 17.366	0 27.195	0 37.025	0 46.854	0 56.684	1 6.513	1 16.343	46	0.126
47	0 7.700	0 17.529	0 27.359	0 37.188	0 47.018	0 56.848	1 6.677	1 16.507	47	0.128
48	0 7.864	0 17.693	0 27.523	0 37.352	0 47.182	0 57.011	1 6.841	1 16.671	48	0.131
49	0 8.027	0 17.857	0 27.687	0 37.516	0 47.346	0 57.175	1 7.005	1 16.834	49	0.134
50	0 8.191	0 18.021	0 27.850	0 37.680	0 47.510	0 57.339	1 7.169	1 16.998	50	0.137
51	0 8.355	0 18.185	0 28.014	0 37.844	0 47.673	0 57.503	1 7.332	1 17.162	51	0.139
52	0 8.519	0 18.349	0 28.178	0 38.008	0 47.837	0 57.667	1 7.496	1 17.326	52	0.142
53	0 8.683	0 18.512	0 28.342	0 38.171	0 48.001	0 57.831	1 7.660	1 17.490	53	0.145
54	0 8.847	0 18.676	0 28.506	0 38.335	0 48.165	0 57.994	1 7.824	1 17.654	54	0.147
55	0 9.010	0 18.840	0 28.670	0 38.499	0 48.329	0 58.158	1 7.988	1 17.817	55	0.150
56	0 9.174	0 19.004	0 28.833	0 38.663	0 48.492	0 58.322	1 8.152	1 17.981	56	0.153
57	0 9.338	0 19.168	0 28.997	0 38.827	0 48.656	0 58.486	1 8.315	1 18.145	57	0.156
58	0 9.502	0 19.331	0 29.161	0 38.991	0 48.820	0 58.650	1 8.479	1 18.309	58	0.158
59	0 9.666	0 19.495	0 29.325	0 39.154	0 48.984	0 58.814	1 8.643	1 18.473	59	0.161
Side-real.	$0^{\text{h.}}$	$1^{\text{h.}}$	$2^{\text{h.}}$	$3^{\text{h.}}$	$4^{\text{h.}}$	$5^{\text{h.}}$	$6^{\text{h.}}$	$7^{\text{h.}}$	For Seconds.	

TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Side-real.	$8^{h.}$	$9^{h.}$	$10^{h.}$	$11^{h.}$	$12^{h.}$	$13^{h.}$	$14^{h.}$	$15^{h.}$	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	1 18.636	1 28.466	1 38.296	1 48.125	1 57.955	2 7.784	2 17.614	2 27.443	0	0.000
1	1 18.800	1 28.630	1 38.459	1 48.289	1 58.119	2 7.948	2 17.778	2 27.607	1	0.003
2	1 18.964	1 28.794	1 38.623	1 48.453	1 58.282	2 8.112	2 17.941	2 27.771	2	0.005
3	1 19.128	1 28.958	1 38.787	1 48.617	1 58.446	2 8.276	2 18.105	2 27.935	3	0.008
4	1 19.292	1 29.121	1 38.951	1 48.780	1 58.610	2 8.440	2 18.269	2 28.099	4	0.011
5	1 19.456	1 29.285	1 39.115	1 48.944	1 58.774	2 8.603	2 18.433	2 28.263	5	0.014
6	1 19.619	1 29.449	1 39.279	1 49.108	1 58.938	2 8.767	2 18.597	2 28.426	6	0.016
7	1 19.783	1 29.613	1 39.442	1 49.272	1 59.101	2 8.931	2 18.761	2 28.590	7	0.019
8	1 19.947	1 29.777	1 39.606	1 49.436	1 59.265	2 9.095	2 18.924	2 28.754	8	0.022
9	1 20.111	1 29.940	1 39.770	1 49.600	1 59.429	2 9.259	2 19.088	2 28.918	9	0.025
10	1 20.275	1 30.104	1 39.934	1 49.763	1 59.593	2 9.423	2 19.252	2 29.082	10	0.027
11	1 20.439	1 30.268	1 40.098	1 49.927	1 59.757	2 9.586	2 19.416	2 29.245	11	0.030
12	1 20.602	1 30.432	1 40.261	1 50.091	1 59.921	2 9.750	2 19.580	2 29.409	12	0.033
13	1 20.766	1 30.596	1 40.425	1 50.255	2 0.084	2 9.914	2 19.744	2 29.573	13	0.035
14	1 20.930	1 30.760	1 40.589	1 50.419	2 0.248	2 10.078	2 19.907	2 29.737	14	0.038
15	1 21.094	1 30.923	1 40.753	1 50.583	2 0.412	2 10.242	2 20.071	2 29.901	15	0.041
16	1 21.258	1 31.087	1 40.917	1 50.746	2 0.576	2 10.405	2 20.235	2 30.065	16	0.044
17	1 21.422	1 31.251	1 41.081	1 50.910	2 0.740	2 10.569	2 20.399	2 30.228	17	0.046
18	1 21.585	1 31.415	1 41.244	1 51.074	2 0.904	2 10.733	2 20.563	2 30.392	18	0.049
19	1 21.749	1 31.579	1 41.408	1 51.238	2 1.067	2 10.897	2 20.727	2 30.556	19	0.052
20	1 21.913	1 31.743	1 41.572	1 51.402	2 1.231	2 11.061	2 20.890	2 30.720	20	0.055
21	1 22.077	1 31.906	1 41.736	1 51.565	2 1.395	2 11.225	2 21.054	2 30.884	21	0.057
22	1 22.241	1 32.070	1 41.900	1 51.729	2 1.559	2 11.388	2 21.218	2 31.048	22	0.060
23	1 22.404	1 32.234	1 42.064	1 51.893	2 1.723	2 11.552	2 21.382	2 31.211	23	0.063
24	1 22.568	1 32.398	1 42.227	1 52.057	2 1.887	2 11.716	2 21.546	2 31.375	24	0.066
25	1 22.732	1 32.562	1 42.391	1 52.221	2 2.050	2 11.880	2 21.709	2 31.539	25	0.068
26	1 22.896	1 32.726	1 42.555	1 52.385	2 2.214	2 12.044	2 21.873	2 31.703	26	0.071
27	1 23.060	1 32.889	1 42.719	1 52.548	2 2.378	2 12.208	2 22.037	2 31.867	27	0.074
28	1 23.224	1 33.053	1 42.883	1 52.712	2 2.542	2 12.371	2 22.201	2 32.031	28	0.076
29	1 23.387	1 33.217	1 43.047	1 52.876	2 2.706	2 12.535	2 22.365	2 32.194	29	0.079
30	1 23.551	1 33.381	1 43.210	1 53.040	2 2.869	2 12.699	2 22.529	2 32.358	30	0.082
31	1 23.715	1 33.545	1 43.374	1 53.204	2 3.033	2 12.863	2 22.692	2 32.522	31	0.085
32	1 23.879	1 33.708	1 43.538	1 53.368	2 3.197	2 13.027	2 22.856	2 32.686	32	0.087
33	1 24.043	1 33.872	1 43.702	1 53.531	2 3.361	2 13.191	2 23.020	2 32.850	33	0.090
34	1 24.207	1 34.036	1 43.866	1 53.695	2 3.525	2 13.354	2 23.184	2 33.013	34	0.093
35	1 24.370	1 34.200	1 44.029	1 53.859	2 3.689	2 13.518	2 23.348	2 33.177	35	0.096
36	1 24.534	1 34.364	1 44.193	1 54.023	2 3.852	2 13.682	2 23.512	2 33.341	36	0.098
37	1 24.698	1 34.528	1 44.357	1 54.187	2 4.016	2 13.846	2 23.675	2 33.505	37	0.101
38	1 24.862	1 34.691	1 44.521	1 54.351	2 4.180	2 14.010	2 23.839	2 33.669	38	0.104
39	1 25.026	1 34.855	1 44.685	1 54.514	2 4.344	2 14.173	2 24.003	2 33.833	39	0.106
40	1 25.190	1 35.019	1 44.849	1 54.678	2 4.508	2 14.337	2 24.167	2 33.996	40	0.109
41	1 25.353	1 35.183	1 45.012	1 54.842	2 4.672	2 14.501	2 24.331	2 34.160	41	0.112
42	1 25.517	1 35.347	1 45.176	1 55.006	2 4.835	2 14.665	2 24.495	2 34.324	42	0.115
43	1 25.681	1 35.511	1 45.340	1 55.170	2 4.999	2 14.829	2 24.658	2 34.488	43	0.117
44	1 25.845	1 35.674	1 45.504	1 55.333	2 5.163	2 14.993	2 24.822	2 34.652	44	0.120
45	1 26.009	1 35.838	1 45.668	1 55.497	2 5.327	2 15.156	2 24.986	2 34.816	45	0.123
46	1 26.172	1 36.002	1 45.832	1 55.661	2 5.491	2 15.320	2 25.150	2 34.979	46	0.126
47	1 26.336	1 36.166	1 45.995	1 55.825	2 5.655	2 15.484	2 25.314	2 35.143	47	0.128
48	1 26.500	1 36.330	1 46.159	1 55.989	2 5.818	2 15.648	2 25.477	2 35.307	48	0.131
49	1 26.664	1 36.493	1 46.323	1 56.153	2 5.982	2 15.812	2 25.641	2 35.471	49	0.134
50	1 26.828	1 36.657	1 46.487	1 56.316	2 6.146	2 15.976	2 25.805	2 35.635	50	0.137
51	1 26.992	1 36.821	1 46.651	1 56.480	2 6.310	2 16.139	2 25.969	2 35.798	51	0.139
52	1 27.155	1 36.985	1 46.815	1 56.644	2 6.474	2 16.303	2 26.133	2 35.962	52	0.142
53	1 27.319	1 37.149	1 46.978	1 56.808	2 6.637	2 16.467	2 26.297	2 36.126	53	0.145
54	1 27.483	1 37.313	1 47.142	1 56.972	2 6.801	2 16.631	2 26.460	2 36.290	54	0.147
55	1 27.647	1 37.476	1 47.306	1 57.136	2 6.965	2 16.795	2 26.624	2 36.454	55	0.150
56	1 27.811	1 37.640	1 47.470	1 57.299	2 7.129	2 16.959	2 26.788	2 36.618	56	0.153
57	1 27.975	1 37.804	1 47.634	1 57.463	2 7.293	2 17.122	2 26.952	2 36.781	57	0.156
58	1 28.138	1 37.968	1 47.797	1 57.627	2 7.457	2 17.286	2 27.116	2 36.945	58	0.158
59	1 28.302	1 38.132	1 47.961	1 57.791	2 7.620	2 17.450	2 27.280	2 37.109	59	0.161
Side-real.	$8^{h.}$	$9^{h.}$	$10^{h.}$	$11^{h.}$	$12^{h.}$	$13^{h.}$	$14^{h.}$	$15^{h.}$	For Seconds.	

TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Sidereal.	$16^{\text{h.}}$	$17^{\text{h.}}$	$18^{\text{h.}}$	$19^{\text{h.}}$	$20^{\text{h.}}$	$21^{\text{h.}}$	$22^{\text{h.}}$	$23^{\text{h.}}$	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	2 37.273	2 47.102	2 56.932	3 6.762	3 16.591	3 26.421	3 36.250	3 46.080	0	0.000
1	2 37.437	2 47.266	2 57.096	3 6.925	3 16.755	3 26.585	3 36.414	3 46.244	1	0.003
2	2 37.601	2 47.430	2 57.260	3 7.089	3 16.919	3 26.748	3 36.578	3 46.407	2	0.005
3	2 37.764	2 47.594	2 57.424	3 7.253	3 17.083	3 26.912	3 36.742	3 46.571	3	0.008
4	2 37.928	2 47.758	2 57.587	3 7.417	3 17.246	3 27.076	3 36.906	3 46.735	4	0.011
5	2 38.092	2 47.922	2 57.751	3 7.581	3 17.410	3 27.240	3 37.069	3 46.899	5	0.014
6	2 38.256	2 48.085	2 57.915	3 7.745	3 17.574	3 27.404	3 37.233	3 47.063	6	0.016
7	2 38.420	2 48.249	2 58.079	3 7.908	3 17.738	3 27.568	3 37.397	3 47.227	7	0.019
8	2 38.584	2 48.413	2 58.243	3 8.072	3 17.902	3 27.731	3 37.561	3 47.390	8	0.022
9	2 38.747	2 48.577	2 58.406	3 8.236	3 18.066	3 27.895	3 37.725	3 47.554	9	0.025
10	2 38.911	2 48.741	2 58.570	3 8.400	3 18.229	3 28.059	3 37.889	3 47.718	10	0.027
11	2 39.075	2 48.905	2 58.734	3 8.564	3 18.393	3 28.223	3 38.052	3 47.882	11	0.030
12	2 39.239	2 49.068	2 58.898	3 8.728	3 18.557	3 28.387	3 38.216	3 48.046	12	0.033
13	2 39.403	2 49.232	2 59.062	3 8.891	3 18.721	3 28.550	3 38.380	3 48.210	13	0.035
14	2 39.566	2 49.396	2 59.226	3 9.055	3 18.885	3 28.714	3 38.544	3 48.373	14	0.038
15	2 39.730	2 49.560	2 59.389	3 9.219	3 19.049	3 28.878	3 38.708	3 48.537	15	0.041
16	2 39.894	2 49.724	2 59.553	3 9.383	3 19.212	3 29.042	3 38.871	3 48.701	16	0.044
17	2 40.058	2 49.888	2 59.717	3 9.547	3 19.376	3 29.206	3 39.035	3 48.865	17	0.046
18	2 40.222	2 50.051	2 59.881	3 9.710	3 19.540	3 29.370	3 39.199	3 49.029	18	0.049
19	2 40.386	2 50.215	3 0.045	3 9.874	3 19.704	3 29.533	3 39.363	3 49.193	19	0.052
20	2 40.549	2 50.379	3 0.209	3 10.038	3 19.868	3 29.697	3 39.527	3 49.356	20	0.055
21	2 40.713	2 50.543	3 0.372	3 10.202	3 20.032	3 29.861	3 39.691	3 49.520	21	0.057
22	2 40.877	2 50.707	3 0.536	3 10.366	3 20.195	3 30.025	3 39.854	3 49.684	22	0.060
23	2 41.041	2 50.870	3 0.700	3 10.530	3 20.359	3 30.189	3 40.018	3 49.848	23	0.063
24	2 41.205	2 51.034	3 0.864	3 10.693	3 20.523	3 30.353	3 40.182	3 50.012	24	0.066
25	2 41.369	2 51.198	3 1.028	3 10.857	3 20.687	3 30.516	3 40.346	3 50.175	25	0.068
26	2 41.532	2 51.362	3 1.192	3 11.021	3 20.851	3 30.680	3 40.510	3 50.339	26	0.071
27	2 41.696	2 51.526	3 1.355	3 11.185	3 21.014	3 30.844	3 40.674	3 50.503	27	0.074
28	2 41.860	2 51.690	3 1.519	3 11.349	3 21.178	3 31.008	3 40.837	3 50.667	28	0.076
29	2 42.024	2 51.853	3 1.683	3 11.513	3 21.342	3 31.172	3 41.001	3 50.831	29	0.079
30	2 42.188	2 52.017	3 1.847	3 11.676	3 21.506	3 31.336	3 41.165	3 50.995	30	0.082
31	2 42.352	2 52.181	3 2.011	3 11.840	3 21.670	3 31.499	3 41.329	3 51.158	31	0.085
32	2 42.515	2 52.345	3 2.174	3 12.004	3 21.834	3 31.663	3 41.493	3 51.322	32	0.087
33	2 42.679	2 52.509	3 2.338	3 12.168	3 21.997	3 31.827	3 41.657	3 51.486	33	0.090
34	2 42.843	2 52.673	3 2.502	3 12.332	3 22.161	3 31.991	3 41.820	3 51.650	34	0.093
35	2 43.007	2 52.836	3 2.666	3 12.496	3 22.325	3 32.155	3 41.984	3 51.814	35	0.096
36	2 43.171	2 53.000	3 2.830	3 12.659	3 22.489	3 32.318	3 42.148	3 51.978	36	0.098
37	2 43.334	2 53.164	3 2.994	3 12.823	3 22.653	3 32.482	3 42.312	3 52.141	37	0.101
38	2 43.498	2 53.328	3 3.157	3 12.987	3 22.817	3 32.646	3 42.476	3 52.305	38	0.104
39	2 43.662	2 53.492	3 3.321	3 13.151	3 22.980	3 32.810	3 42.639	3 52.469	39	0.106
40	2 43.826	2 53.656	3 3.485	3 13.315	3 23.144	3 32.974	3 42.803	3 52.633	40	0.109
41	2 43.990	2 53.819	3 3.649	3 13.478	3 23.308	3 33.138	3 42.967	3 52.797	41	0.112
42	2 44.154	2 53.983	3 3.813	3 13.642	3 23.472	3 33.301	3 43.131	3 52.961	42	0.115
43	2 44.317	2 54.147	3 3.977	3 13.806	3 23.636	3 33.465	3 43.295	3 53.124	43	0.117
44	2 44.481	2 54.311	3 4.140	3 13.970	3 23.800	3 33.629	3 43.459	3 53.288	44	0.120
45	2 44.645	2 54.475	3 4.304	3 14.134	3 23.963	3 33.793	3 43.622	3 53.452	45	0.123
46	2 44.809	2 54.638	3 4.468	3 14.298	3 24.127	3 33.957	3 43.786	3 53.616	46	0.126
47	2 44.973	2 54.802	3 4.632	3 14.461	3 24.291	3 34.121	3 43.950	3 53.780	47	0.128
48	2 45.137	2 54.966	3 4.796	3 14.625	3 24.455	3 34.284	3 44.114	3 53.943	48	0.131
49	2 45.300	2 55.130	3 4.960	3 14.789	3 24.619	3 34.448	3 44.278	3 54.107	49	0.134
50	2 45.464	2 55.294	3 5.123	3 14.953	3 24.782	3 34.612	3 44.442	3 54.271	50	0.137
51	2 45.628	2 55.458	3 5.287	3 15.117	3 24.946	3 34.776	3 44.605	3 54.435	51	0.139
52	2 45.792	2 55.621	3 5.451	3 15.281	3 25.110	3 34.940	3 44.769	3 54.599	52	0.142
53	2 45.956	2 55.785	3 5.615	3 15.444	3 25.274	3 35.104	3 44.933	3 54.763	53	0.145
54	2 46.120	2 55.949	3 5.779	3 15.608	3 25.438	3 35.267	3 45.097	3 54.926	54	0.147
55	2 46.283	2 56.113	3 5.942	3 15.772	3 25.602	3 35.431	3 45.261	3 55.090	55	0.150
56	2 46.447	2 56.277	3 6.106	3 15.936	3 25.765	3 35.595	3 45.425	3 55.254	56	0.153
57	2 46.611	2 56.441	3 6.270	3 16.100	3 25.929	3 35.759	3 45.588	3 55.418	57	0.156
58	2 46.775	2 56.604	3 6.434	3 16.264	3 26.093	3 35.923	3 45.752	3 55.582	58	0.158
59	2 46.939	2 56.768	3 6.598	3 16.427	3 26.257	3 36.086	3 45.916	3 55.746	59	0.161
Sidereal.	$16^{\text{h.}}$	$17^{\text{h.}}$	$18^{\text{h.}}$	$19^{\text{h.}}$	$20^{\text{h.}}$	$21^{\text{h.}}$	$22^{\text{h.}}$	$23^{\text{h.}}$	For Seconds.	

TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	$0^{\text{h.}}$		$1^{\text{h.}}$		$2^{\text{h.}}$		$3^{\text{h.}}$		$4^{\text{h.}}$		$5^{\text{h.}}$		$6^{\text{h.}}$		$7^{\text{h.}}$		For Seconds.	
m	m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s	s	s
0	0	0.000	0	9.856	0	19.713	0	29.569	0	39.426	0	49.282	0	59.139	1	8.995	0	0.000
1	0	0.164	0	10.021	0	19.877	0	29.734	0	39.590	0	49.447	0	59.303	1	9.160	1	0.003
2	0	0.329	0	10.185	0	20.041	0	29.898	0	39.754	0	49.611	0	59.467	1	9.324	2	0.005
3	0	0.493	0	10.349	0	20.206	0	30.062	0	39.919	0	49.775	0	59.632	1	9.488	3	0.008
4	0	0.657	0	10.514	0	20.370	0	30.227	0	40.083	0	49.939	0	59.796	1	9.652	4	0.011
5	0	0.821	0	10.678	0	20.534	0	30.391	0	40.247	0	50.104	0	59.960	1	9.817	5	0.014
6	0	0.986	0	10.842	0	20.699	0	30.555	0	40.412	0	50.268	1	0.124	1	9.981	6	0.016
7	0	1.150	0	11.006	0	20.863	0	30.719	0	40.576	0	50.432	1	0.289	1	10.145	7	0.019
8	0	1.314	0	11.171	0	21.027	0	30.884	0	40.740	0	50.597	1	0.453	1	10.310	8	0.022
9	0	1.478	0	11.335	0	21.191	0	31.048	0	40.904	0	50.761	1	0.617	1	10.474	9	0.025
10	0	1.643	0	11.499	0	21.356	0	31.212	0	41.069	0	50.925	1	0.782	1	10.638	10	0.027
11	0	1.807	0	11.663	0	21.520	0	31.376	0	41.233	0	51.089	1	0.946	1	10.802	11	0.030
12	0	1.971	0	11.828	0	21.684	0	31.541	0	41.397	0	51.254	1	1.110	1	10.967	12	0.033
13	0	2.136	0	11.992	0	21.849	0	31.705	0	41.561	0	51.418	1	1.274	1	11.131	13	0.036
14	0	2.300	0	12.156	0	22.013	0	31.869	0	41.726	0	51.582	1	1.439	1	11.295	14	0.038
15	0	2.464	0	12.321	0	22.177	0	32.034	0	41.890	0	51.746	1	1.603	1	11.459	15	0.041
16	0	2.628	0	12.485	0	22.341	0	32.198	0	42.054	0	51.911	1	1.767	1	11.624	16	0.044
17	0	2.793	0	12.649	0	22.506	0	32.362	0	42.219	0	52.075	1	1.932	1	11.788	17	0.047
18	0	2.957	0	12.813	0	22.670	0	32.526	0	42.383	0	52.239	1	2.096	1	11.952	18	0.049
19	0	3.121	0	12.978	0	22.834	0	32.691	0	42.547	0	52.404	1	2.260	1	12.117	19	0.052
20	0	3.285	0	13.142	0	22.998	0	32.855	0	42.711	0	52.568	1	2.424	1	12.281	20	0.055
21	0	3.450	0	13.306	0	23.163	0	33.019	0	42.876	0	52.732	1	2.589	1	12.445	21	0.057
22	0	3.614	0	13.471	0	23.327	0	33.183	0	43.040	0	52.896	1	2.753	1	12.609	22	0.060
23	0	3.778	0	13.635	0	23.491	0	33.348	0	43.204	0	53.061	1	2.917	1	12.774	23	0.063
24	0	3.943	0	13.799	0	23.656	0	33.512	0	43.368	0	53.225	1	3.081	1	12.938	24	0.066
25	0	4.107	0	13.963	0	23.820	0	33.676	0	43.533	0	53.389	1	3.246	1	13.102	25	0.068
26	0	4.271	0	14.128	0	23.984	0	33.841	0	43.697	0	53.554	1	3.410	1	13.266	26	0.071
27	0	4.435	0	14.292	0	24.148	0	34.005	0	43.861	0	53.718	1	3.574	1	13.431	27	0.074
28	0	4.600	0	14.456	0	24.313	0	34.169	0	44.026	0	53.882	1	3.739	1	13.595	28	0.077
29	0	4.764	0	14.620	0	24.477	0	34.333	0	44.190	0	54.046	1	3.903	1	13.759	29	0.079
30	0	4.928	0	14.785	0	24.641	0	34.498	0	44.354	0	54.211	1	4.067	1	13.924	30	0.082
31	0	5.093	0	14.949	0	24.805	0	34.662	0	44.518	0	54.375	1	4.231	1	14.088	31	0.085
32	0	5.257	0	15.113	0	24.970	0	34.826	0	44.683	0	54.539	1	4.396	1	14.252	32	0.088
33	0	5.421	0	15.278	0	25.134	0	34.990	0	44.847	0	54.703	1	4.560	1	14.416	33	0.090
34	0	5.585	0	15.442	0	25.298	0	35.155	0	45.011	0	54.868	1	4.724	1	14.581	34	0.093
35	0	5.750	0	15.606	0	25.463	0	35.319	0	45.176	0	55.032	1	4.888	1	14.745	35	0.096
36	0	5.914	0	15.770	0	25.627	0	35.483	0	45.340	0	55.196	1	5.053	1	14.909	36	0.099
37	0	6.078	0	15.935	0	25.791	0	35.648	0	45.504	0	55.361	1	5.217	1	15.073	37	0.101
38	0	6.242	0	16.099	0	25.955	0	35.812	0	45.668	0	55.525	1	5.381	1	15.238	38	0.104
39	0	6.407	0	16.263	0	26.120	0	35.976	0	45.833	0	55.689	1	5.546	1	15.402	39	0.107
40	0	6.571	0	16.427	0	26.284	0	36.140	0	45.997	0	55.853	1	5.710	1	15.566	40	0.110
41	0	6.735	0	16.592	0	26.448	0	36.305	0	46.161	0	56.018	1	5.874	1	15.731	41	0.112
42	0	6.900	0	16.756	0	26.612	0	36.469	0	46.325	0	56.182	1	6.038	1	15.895	42	0.115
43	0	7.064	0	16.920	0	26.777	0	36.633	0	46.490	0	56.346	1	6.203	1	16.059	43	0.118
44	0	7.228	0	17.085	0	26.941	0	36.798	0	46.654	0	56.510	1	6.367	1	16.223	44	0.120
45	0	7.392	0	17.249	0	27.105	0	36.962	0	46.818	0	56.675	1	6.531	1	16.388	45	0.123
46	0	7.557	0	17.413	0	27.270	0	37.126	0	46.983	0	56.839	1	6.695	1	16.552	46	0.126
47	0	7.721	0	17.577	0	27.434	0	37.290	0	47.147	0	57.003	1	6.860	1	16.716	47	0.129
48	0	7.885	0	17.742	0	27.598	0	37.455	0	47.311	0	57.168	1	7.024	1	16.881	48	0.131
49	0	8.049	0	17.906	0	27.762	0	37.619	0	47.475	0	57.332	1	7.188	1	17.045	49	0.134
50	0	8.214	0	18.070	0	27.927	0	37.783	0	47.640	0	57.496	1	7.353	1	17.209	50	0.137
51	0	8.378	0	18.234	0	28.091	0	37.947	0	47.804	0	57.660	1	7.517	1	17.373	51	0.140
52	0	8.542	0	18.399	0	28.255	0	38.112	0	47.968	0	57.825	1	7.681	1	17.538	52	0.142
53	0	8.707	0	18.563	0	28.420	0	38.276	0	48.132	0	57.989	1	7.845	1	17.702	53	0.145
54	0	8.871	0	18.727	0	28.584	0	38.440	0	48.297	0	58.153	1	8.010	1	17.866	54	0.148
55	0	9.035	0	18.892	0	28.748	0	38.605	0	48.461	0	58.317	1	8.174	1	18.030	55	0.151
56	0	9.199	0	19.056	0	28.912	0	38.769	0	48.625	0	58.482	1	8.338	1	18.195	56	0.153
57	0	9.364	0	19.220	0	29.077	0	38.933	0	48.790	0	58.646	1	8.502	1	18.359	57	0.156
58	0	9.528	0	19.384	0	29.241	0	39.097	0	48.954	0	58.810	1	8.667	1	18.523	58	0.159
59	0	9.692	0	19.549	0	29.405	0	39.262	0	49.118	0	58.975	1	8.831	1	18.688	59	0.162
Mean Solar.	$0^{\text{h.}}$		$1^{\text{h.}}$		$2^{\text{h.}}$		$3^{\text{h.}}$		$4^{\text{h.}}$		$5^{\text{h.}}$		$6^{\text{h.}}$		$7^{\text{h.}}$		For Seconds.	

TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	$8^{\text{h.}}$	$9^{\text{h.}}$	$10^{\text{h.}}$	$11^{\text{h.}}$	$12^{\text{h.}}$	$13^{\text{h.}}$	$14^{\text{h.}}$	$15^{\text{h.}}$	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	1 18.852	1 28.708	1 38.565	1 48.421	1 58.278	2 8.134	2 17.991	2 27.847	0	0.000
1	1 19.016	1 28.873	1 38.729	1 48.585	1 58.442	2 8.298	2 18.155	2 28.011	1	0.003
2	1 19.180	1 29.037	1 38.893	1 48.750	1 58.606	2 8.463	2 18.319	2 28.176	2	0.005
3	1 19.345	1 29.201	1 39.058	1 48.914	1 58.771	2 8.627	2 18.483	2 28.340	3	0.008
4	1 19.509	1 29.365	1 39.222	1 49.078	1 58.935	2 8.791	2 18.648	2 28.504	4	0.011
5	1 19.673	1 29.530	1 39.386	1 49.243	1 59.099	2 8.956	2 18.812	2 28.668	5	0.014
6	1 19.837	1 29.694	1 39.550	1 49.407	1 59.263	2 9.120	2 18.976	2 28.833	6	0.016
7	1 20.002	1 29.858	1 39.715	1 49.571	1 59.428	2 9.284	2 19.141	2 28.997	7	0.019
8	1 20.166	1 30.022	1 39.879	1 49.735	1 59.592	2 9.448	2 19.305	2 29.161	8	0.022
9	1 20.330	1 30.187	1 40.043	1 49.900	1 59.756	2 9.613	2 19.469	2 29.326	9	0.025
10	1 20.495	1 30.351	1 40.207	1 50.064	1 59.920	2 9.777	2 19.633	2 29.490	10	0.027
11	1 20.659	1 30.515	1 40.372	1 50.228	2 0.085	2 9.941	2 19.798	2 29.654	11	0.030
12	1 20.823	1 30.680	1 40.536	1 50.393	2 0.249	2 10.105	2 19.962	2 29.818	12	0.033
13	1 20.987	1 30.844	1 40.700	1 50.557	2 0.413	2 10.270	2 20.126	2 29.983	13	0.036
14	1 21.152	1 31.008	1 40.865	1 50.721	2 0.578	2 10.434	2 20.290	2 30.147	14	0.038
15	1 21.316	1 31.172	1 41.029	1 50.885	2 0.742	2 10.598	2 20.455	2 30.311	15	0.041
16	1 21.480	1 31.337	1 41.193	1 51.050	2 0.906	2 10.763	2 20.619	2 30.476	16	0.044
17	1 21.644	1 31.501	1 41.357	1 51.214	2 1.070	2 10.927	2 20.783	2 30.640	17	0.047
18	1 21.809	1 31.665	1 41.522	1 51.378	2 1.235	2 11.091	2 20.948	2 30.804	18	0.049
19	1 21.973	1 31.829	1 41.686	1 51.542	2 1.399	2 11.255	2 21.112	2 30.968	19	0.052
20	1 22.137	1 31.994	1 41.850	1 51.707	2 1.563	2 11.420	2 21.276	2 31.133	20	0.055
21	1 22.302	1 32.158	1 42.015	1 51.871	2 1.727	2 11.584	2 21.440	2 31.297	21	0.057
22	1 22.466	1 32.322	1 42.179	1 52.035	2 1.892	2 11.748	2 21.605	2 31.461	22	0.060
23	1 22.630	1 32.487	1 42.343	1 52.200	2 2.056	2 11.912	2 21.769	2 31.625	23	0.063
24	1 22.794	1 32.651	1 42.507	1 52.364	2 2.220	2 12.077	2 21.933	2 31.790	24	0.066
25	1 22.959	1 32.815	1 42.672	1 52.528	2 2.385	2 12.241	2 22.098	2 31.954	25	0.068
26	1 23.123	1 32.979	1 42.836	1 52.692	2 2.549	2 12.405	2 22.262	2 32.118	26	0.071
27	1 23.287	1 33.144	1 43.000	1 52.857	2 2.713	2 12.570	2 22.426	2 32.283	27	0.074
28	1 23.451	1 33.308	1 43.164	1 53.021	2 2.877	2 12.734	2 22.590	2 32.447	28	0.077
29	1 23.616	1 33.472	1 43.329	1 53.185	2 3.042	2 12.898	2 22.755	2 32.611	29	0.079
30	1 23.780	1 33.637	1 43.493	1 53.349	2 3.206	2 13.062	2 22.919	2 32.775	30	0.082
31	1 23.944	1 33.801	1 43.657	1 53.514	2 3.370	2 13.227	2 23.083	2 32.940	31	0.085
32	1 24.109	1 33.965	1 43.822	1 53.678	2 3.534	2 13.391	2 23.247	2 33.104	32	0.088
33	1 24.273	1 34.129	1 43.986	1 53.842	2 3.699	2 13.555	2 23.412	2 33.268	33	0.090
34	1 24.437	1 34.294	1 44.150	1 54.007	2 3.863	2 13.720	2 23.576	2 33.432	34	0.093
35	1 24.601	1 34.458	1 44.314	1 54.171	2 4.027	2 13.884	2 23.740	2 33.597	35	0.096
36	1 24.766	1 34.622	1 44.479	1 54.335	2 4.192	2 14.048	2 23.905	2 33.761	36	0.099
37	1 24.930	1 34.786	1 44.643	1 54.499	2 4.356	2 14.212	2 24.069	2 33.925	37	0.101
38	1 25.094	1 34.951	1 44.807	1 54.664	2 4.520	2 14.377	2 24.233	2 34.090	38	0.104
39	1 25.259	1 35.115	1 44.971	1 54.828	2 4.684	2 14.541	2 24.397	2 34.254	39	0.107
40	1 25.423	1 35.279	1 45.136	1 54.992	2 4.849	2 14.705	2 24.562	2 34.418	40	0.110
41	1 25.587	1 35.444	1 45.300	1 55.156	2 5.013	2 14.869	2 24.726	2 34.582	41	0.112
42	1 25.751	1 35.608	1 45.464	1 55.321	2 5.177	2 15.034	2 24.890	2 34.747	42	0.115
43	1 25.916	1 35.772	1 45.629	1 55.485	2 5.342	2 15.198	2 25.054	2 34.911	43	0.118
44	1 26.080	1 35.936	1 45.793	1 55.649	2 5.506	2 15.362	2 25.219	2 35.075	44	0.120
45	1 26.244	1 36.101	1 45.957	1 55.814	2 5.670	2 15.527	2 25.383	2 35.239	45	0.123
46	1 26.408	1 36.265	1 46.121	1 55.978	2 5.834	2 15.691	2 25.547	2 35.404	46	0.126
47	1 26.573	1 36.429	1 46.286	1 56.142	2 5.999	2 15.855	2 25.712	2 35.568	47	0.129
48	1 26.737	1 36.593	1 46.450	1 56.306	2 6.163	2 16.019	2 25.876	2 35.732	48	0.131
49	1 26.901	1 36.758	1 46.614	1 56.471	2 6.327	2 16.184	2 26.040	2 35.897	49	0.134
50	1 27.066	1 36.922	1 46.778	1 56.635	2 6.491	2 16.348	2 26.204	2 36.061	50	0.137
51	1 27.230	1 37.086	1 46.943	1 56.799	2 6.656	2 16.512	2 26.369	2 36.225	51	0.140
52	1 27.394	1 37.251	1 47.107	1 56.964	2 6.820	2 16.676	2 26.533	2 36.389	52	0.142
53	1 27.558	1 37.415	1 47.271	1 57.128	2 6.984	2 16.841	2 26.697	2 36.554	53	0.145
54	1 27.723	1 37.579	1 47.436	1 57.292	2 7.149	2 17.005	2 26.861	2 36.718	54	0.148
55	1 27.887	1 37.743	1 47.600	1 57.456	2 7.313	2 17.169	2 27.026	2 36.882	55	0.151
56	1 28.051	1 37.908	1 47.764	1 57.621	2 7.477	2 17.334	2 27.190	2 37.047	56	0.153
57	1 28.215	1 38.072	1 47.928	1 57.785	2 7.641	2 17.498	2 27.354	2 37.211	57	0.156
58	1 28.380	1 38.236	1 48.093	1 57.949	2 7.806	2 17.662	2 27.519	2 37.375	58	0.159
59	1 28.544	1 38.400	1 48.257	1 58.113	2 7.970	2 17.826	2 27.683	2 37.539	59	0.162
Mean Solar.	$8^{\text{h.}}$	$9^{\text{h.}}$	$10^{\text{h.}}$	$11^{\text{h.}}$	$12^{\text{h.}}$	$13^{\text{h.}}$	$14^{\text{h.}}$	$15^{\text{h.}}$	For Seconds.	

TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	16^h	17^h	18^h	19^h	20^h	21^h	22^h	23^h	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	2 37.704	2 47.560	2 57.417	3 7.273	3 17.129	3 26.986	3 36.842	3 46.699	0	0.000
1	2 37.868	2 47.724	2 57.581	3 7.437	3 17.294	3 27.150	3 37.007	3 46.863	1	0.003
2	2 38.032	2 47.889	2 57.745	3 7.602	3 17.458	3 27.315	3 37.171	3 47.027	2	0.005
3	2 38.196	2 48.053	2 57.909	3 7.766	3 17.622	3 27.479	3 37.335	3 47.192	3	0.008
4	2 38.361	2 48.217	2 58.074	3 7.930	3 17.787	3 27.643	3 37.500	3 47.356	4	0.011
5	2 38.525	2 48.381	2 58.238	3 8.094	3 17.951	3 27.807	3 37.664	3 47.520	5	0.014
6	2 38.689	2 48.546	2 58.402	3 8.259	3 18.115	3 27.972	3 37.828	3 47.685	6	0.016
7	2 38.854	2 48.710	2 58.566	3 8.423	3 18.279	3 28.136	3 37.992	3 47.849	7	0.019
8	2 39.018	2 48.874	2 58.731	3 8.587	3 18.444	3 28.300	3 38.157	3 48.013	8	0.022
9	2 39.182	2 49.039	2 58.895	3 8.751	3 18.608	3 28.464	3 38.321	3 48.177	9	0.025
10	2 39.346	2 49.203	2 59.059	3 8.916	3 18.772	3 28.629	3 38.485	3 48.342	10	0.027
11	2 39.511	2 49.367	2 59.224	3 9.080	3 18.937	3 28.793	3 38.649	3 48.506	11	0.030
12	2 39.675	2 49.531	2 59.388	3 9.244	3 19.101	3 28.957	3 38.814	3 48.670	12	0.033
13	2 39.839	2 49.696	2 59.552	3 9.409	3 19.265	3 29.122	3 38.978	3 48.834	13	0.036
14	2 40.003	2 49.860	2 59.716	3 9.573	3 19.429	3 29.286	3 39.142	3 48.999	14	0.038
15	2 40.168	2 50.024	2 59.881	3 9.737	3 19.594	3 29.450	3 39.307	3 49.163	15	0.041
16	2 40.332	2 50.188	3 0.045	3 9.901	3 19.758	3 29.614	3 39.471	3 49.327	16	0.044
17	2 40.496	2 50.353	3 0.209	3 10.066	3 19.922	3 29.779	3 39.635	3 49.492	17	0.047
18	2 40.661	2 50.517	3 0.373	3 10.230	3 20.086	3 29.943	3 39.799	3 49.656	18	0.049
19	2 40.825	2 50.681	3 0.538	3 10.394	3 20.251	3 30.107	3 39.964	3 49.820	19	0.052
20	2 40.989	2 50.846	3 0.702	3 10.559	3 20.415	3 30.271	3 40.128	3 49.984	20	0.055
21	2 41.153	2 51.010	3 0.866	3 10.723	3 20.579	3 30.436	3 40.292	3 50.149	21	0.057
22	2 41.318	2 51.174	3 1.031	3 10.887	3 20.744	3 30.600	3 40.456	3 50.313	22	0.060
23	2 41.482	2 51.338	3 1.195	3 11.051	3 20.908	3 30.764	3 40.621	3 50.477	23	0.063
24	2 41.646	2 51.503	3 1.359	3 11.216	3 21.072	3 30.929	3 40.785	3 50.642	24	0.066
25	2 41.810	2 51.667	3 1.523	3 11.380	3 21.236	3 31.093	3 40.949	3 50.806	25	0.068
26	2 41.975	2 51.831	3 1.688	3 11.544	3 21.401	3 31.257	3 41.114	3 50.970	26	0.071
27	2 42.139	2 51.995	3 1.852	3 11.708	3 21.565	3 31.421	3 41.278	3 51.134	27	0.074
28	2 42.303	2 52.160	3 2.016	3 11.873	3 21.729	3 31.586	3 41.442	3 51.299	28	0.077
29	2 42.468	2 52.324	3 2.181	3 12.037	3 21.893	3 31.750	3 41.606	3 51.463	29	0.079
30	2 42.632	2 52.488	3 2.345	3 12.201	3 22.058	3 31.914	3 41.771	3 51.627	30	0.082
31	2 42.796	2 52.653	3 2.509	3 12.366	3 22.222	3 32.078	3 41.935	3 51.791	31	0.085
32	2 42.960	2 52.817	3 2.673	3 12.530	3 22.386	3 32.243	3 42.099	3 51.956	32	0.088
33	2 43.125	2 52.981	3 2.838	3 12.694	3 22.551	3 32.407	3 42.264	3 52.120	33	0.090
34	2 43.289	2 53.145	3 3.002	3 12.858	3 22.715	3 32.571	3 42.428	3 52.284	34	0.093
35	2 43.453	2 53.310	3 3.166	3 13.023	3 22.879	3 32.736	3 42.592	3 52.449	35	0.096
36	2 43.617	2 53.474	3 3.330	3 13.187	3 23.043	3 32.900	3 42.756	3 52.613	36	0.099
37	2 43.782	2 53.638	3 3.495	3 13.351	3 23.208	3 33.064	3 42.921	3 52.777	37	0.101
38	2 43.946	2 53.803	3 3.659	3 13.515	3 23.372	3 33.228	3 43.085	3 52.941	38	0.104
39	2 44.110	2 53.967	3 3.823	3 13.680	3 23.536	3 33.393	3 43.249	3 53.106	39	0.107
40	2 44.275	2 54.131	3 3.988	3 13.844	3 23.700	3 33.557	3 43.413	3 53.270	40	0.110
41	2 44.439	2 54.295	3 4.152	3 14.008	3 23.865	3 33.721	3 43.578	3 53.434	41	0.112
42	2 44.603	2 54.460	3 4.316	3 14.173	3 24.029	3 33.886	3 43.742	3 53.598	42	0.115
43	2 44.767	2 54.624	3 4.480	3 14.337	3 24.193	3 34.050	3 43.906	3 53.763	43	0.118
44	2 44.932	2 54.788	3 4.645	3 14.501	3 24.358	3 34.214	3 44.071	3 53.927	44	0.120
45	2 45.096	2 54.952	3 4.809	3 14.665	3 24.522	3 34.378	3 44.235	3 54.091	45	0.123
46	2 45.260	2 55.117	3 4.973	3 14.830	3 24.686	3 34.543	3 44.399	3 54.256	46	0.126
47	2 45.425	2 55.281	3 5.137	3 14.994	3 24.850	3 34.707	3 44.563	3 54.420	47	0.129
48	2 45.589	2 55.445	3 5.302	3 15.158	3 25.015	3 34.871	3 44.728	3 54.584	48	0.131
49	2 45.753	2 55.610	3 5.466	3 15.322	3 25.179	3 35.035	3 44.892	3 54.748	49	0.134
50	2 45.917	2 55.774	3 5.630	3 15.487	3 25.343	3 35.200	3 45.056	3 54.913	50	0.137
51	2 46.082	2 55.938	3 5.795	3 15.651	3 25.508	3 35.364	3 45.220	3 55.077	51	0.140
52	2 46.246	2 56.102	3 5.959	3 15.815	3 25.672	3 35.528	3 45.385	3 55.241	52	0.142
53	2 46.410	2 56.267	3 6.123	3 15.980	3 25.836	3 35.693	3 45.549	3 55.405	53	0.145
54	2 46.574	2 56.431	3 6.287	3 16.144	3 26.000	3 35.857	3 45.713	3 55.570	54	0.148
55	2 46.739	2 56.595	3 6.452	3 16.308	3 26.165	3 36.021	3 45.878	3 55.734	55	0.151
56	2 46.903	2 56.759	3 6.616	3 16.472	3 26.329	3 36.185	3 46.042	3 55.898	56	0.153
57	2 47.067	2 56.924	3 6.780	3 16.637	3 26.493	3 36.350	3 46.206	3 56.063	57	0.156
58	2 47.232	2 57.088	3 6.944	3 16.801	3 26.657	3 36.514	3 46.370	3 56.227	58	0.159
59	2 47.396	2 57.252	3 7.109	3 16.965	3 26.822	3 36.678	3 46.535	3 56.391	59	0.162
Mean Solar.	16^h	17^h	18^h	19^h	20^h	21^h	22^h	23^h	For Seconds.	

TABLE IV.—LATITUDE BY POLARIS.

TABLE FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS.

Reduce the observed altitude of Polaris to the true altitude.

Reduce the recorded time of observation to local sidereal time.

If the sidereal time is
- **less than $1^h\ 18^m$, subtract it from $1^h\ 18^m$;**
- **between $1^h\ 18^m$ and $13^h\ 18^m$, subtract $1^h\ 18^m$ from it;**
- **greater than $13^h\ 18^m$, subtract it from $25^h\ 18^m$;**

and the remainder is the hour-angle of Polaris.

With this hour-angle take out the correction from Table IV, and add it to or subtract it from the true altitude, according to its sign. The result is the latitude of the place.

Example.—1889, November 10, at $9^h\ 29^m\ 29^s$, P. M., mean solar time, in longitude 29° east of Greenwich, suppose the true altitude of Polaris to be 29° 29′: required the latitude of the place.

	h m s
Local astronomical mean time	9 29 29
Reduction from Table III, for $9^h\ 29^m\ 29^s$	+ 1 34
Greenwich sidereal time of mean noon, November 10, page 183 .	15 19 20.2
Reduction from Table III, for longitude (= $1^h\ 56^m$ east, or minus)	— 0 19
Sum (having regard to signs) is equal to local sidereal time .	0 50 4.2
	h m s 1 18 0
Subtract sidereal time	0 50 4.2
Remainder is equal to hour-angle of Polaris	0 27 55.8

	° ′
True altitude	+ 29 29.0
Correction from Table IV. . . .	— 1 16.4
Latitude	+ 28 12.6

TABLE IV—1889.

Hour-Angle.	0^h		1^h		2^h		3^h		4^h		5^h	
m	° ′	′	° ′	′	° ′	′	° ′	′	° ′	′	° ′	′
0	− 1 17.0	0.0	− 1 14.3	0.5	− 1 6.4	0.8	− 0 54.0	1.2	− 0 37.8	1.5	− 0 19.1	1.6
5	1 17.0	0.1	1 13.8	0.5	1 5.6	0.9	0 52.8	1.2	0 36.3	1.5	0 17.5	1.6
10	1 16.9	0.1	1 13.3	0.5	1 4.7	0.9	0 51.6	1.3	0 34.8	1.5	0 15.9	1.6
15	1 16.8	0.1	1 12.8	0.6	1 3.8	1.0	0 50.3	1.3	0 33.3	1.5	0 14.3	1.7
20	− 1 16.7	0.2	− 1 12.2	0.6	− 1 2.8	1.0	− 0 49.0	1.3	− 0 31.8	1.5	− 0 12.6	1.7
25	1 16.5	0.2	1 11.6	0.6	1 1.8	1.0	0 47.7	1.4	0 30.3	1.6	0 10.9	1.7
30	1 16.3	0.2	1 11.0	0.7	1 0.8	1.1	0 46.3	1.4	0 28.7	1.6	0 9.2	1.6
35	1 16.1	0.3	1 10.3	0.7	0 59.7	1.1	0 44.9	1.4	0 27.1	1.6	0 7.6	1.7
40	− 1 15.8	0.3	− 1 9.6	0.8	− 0 58.6	1.1	− 0 43.5	1.4	− 0 25.5	1.6	− 0 5.9	1.7
45	1 15.5	0.4	1 8.8	0.8	0 57.5	1.1	0 42.1	1.4	0 23.9	1.6	0 4.2	1.7
50	1 15.1	0.4	1 8.0	0.8	0 56.4	1.2	0 40.7	1.4	0 22.3	1.6	0 2.5	1.7
55	1 14.7	0.4	1 7.2	0.8	0 55.2	1.2	0 39.3	1.5	0 20.7	1.6	− 0 0.8	1.7
60	− 1 14.3		− 1 6.4		− 0 54.0		− 0 37.8		− 0 19.1		+ 0 0.9	

Hour-Angle.	6^h		7^h		8^h		9^h		10^h		11^h	
m	° ′	′	° ′	′	° ′	′	° ′	′	° ′	′	° ′	′
0	+ 0 0.9	1.7	+ 0 20.7	1.6	+ 0 39.1	1.4	+ 0 54.9	1.2	+ 1 6.9	0.8	+ 1 14.4	0.4
5	0 2.6	1.7	0 22.3	1.6	0 40.5	1.4	0 56.1	1.1	1 7.7	0.8	1 14.8	0.4
10	0 4.3	1.7	0 23.9	1.6	0 41.9	1.4	0 57.2	1.1	1 8.5	0.7	1 15.2	0.3
15	0 6.0	1.7	0 25.5	1.6	0 43.3	1.4	0 58.3	1.1	1 9.2	0.7	1 15.5	0.3
20	+ 0 7.7	1.6	+ 0 27.1	1.6	+ 0 44.7	1.4	+ 0 59.4	1.0	+ 1 9.9	0.7	+ 1 15.8	0.3
25	0 9.3	1.6	0 28.7	1.5	0 46.1	1.3	1 0.4	1.0	1 10.6	0.7	1 16.1	0.2
30	0 10.9	1.7	0 30.2	1.6	0 47.4	1.3	1 1.4	1.0	1 11.3	0.6	1 16.3	0.2
35	0 12.6	1.7	0 31.8	1.5	0 48.7	1.3	1 2.4	1.0	1 11.9	0.6	1 16.5	0.2
40	+ 0 14.3	1.6	+ 0 38.3	1.5	+ 0 50.0	1.3	+ 1 3.4	0.9	+ 1 12.5	0.5	+ 1 16.7	0.1
45	0 15.9	1.6	0 34.8	1.5	0 51.3	1.2	1 4.3	0.9	1 13.0	0.5	1 16.8	0.1
50	0 17.5	1.6	0 36.3	1.4	0 52.5	1.2	1 5.2	0.9	1 13.5	0.5	1 16.9	0.1
55	0 19.1	1.6	0 37.7	1.4	0 53.7	1.2	1 6.1	0.8	1 14.0	0.4	1 17.0	0.0
60	+ 0 20.7		+ 0 39.1		+ 0 54.9		+ 1 6.9		+ 1 14.4		+ 1 17.0	